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NEUROSES.

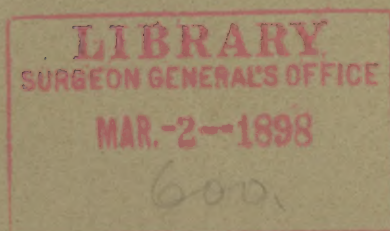
BY

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Physician to Out-Patient Department, City Hospital (Nervous Diseases), Boston, Mass.

Reprinted from "The International System of Electro-Therapeutics." Published by The
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NEUROSES.

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MODE OF ACTION OF ELECTRICITY IN NEUROSES.

NEUROSES are, *par excellence*, the kind of nervous disease in which favorable results are obtained from electrical treatment. More or less doubt may be entertained whether electricity may alter for good or for evil such disease processes as cause organic change in the central nervous system, but any one who has had extensive experience in treating functional nervous affections with electricity must either bear witness to the favorable results observed or else lay himself open to the suspicion that he has not the skill and judgment necessary for its proper employment. Of course, in some kinds of neuroses and psychoses its effects are more marked than in others, while some may be absolutely rebellious to its influence. But the same is true of all therapeutic agents. It is also true that some physicians are less successful than others in using electrization, —a difference which, it may be suspected, depends in part upon the judgment with which suitable cases are selected for treatment, and in part upon the skill with which electricity is applied. This general statement of the beneficial effect of electrization in this class of diseases is not a committal to any particular theory of its mode of action. It does not imply that electricity must have a specific influence as electricity on the nervous elements, or that its curative results are brought about in a way other than that of reflex stimulation of the skin and peripheral nerves; indeed, it is not incompatible with the belief that the therapeutic effects are due entirely to the mental effect or suggestion. Whatever its mode of action, the treatment of neuroses by electricity is often followed by beneficial results.

At this point, then, it will be well, once for all, to consider the modes of action of electricity, in order to avoid repetition when, later, we discuss the treatment of the different neuroses by themselves. It will then be understood that all that is necessary has been said in this matter. There are several ways in which electricity is capable of action on the nervous system so as to produce its therapeutic effect, although it is not always easy to determine the one that is active in individual cases.

Considerable skepticism has been awakened of late years regarding the possible specific action of electricity in curing disease. The exaggerated claims of the earlier observers of the power of electricity to cure organic disease, such as cerebral hæmorrhage, spinal sclerosis, etc., have led to a reaction which not only denies all curative influence in such

affections, but attributes all the beneficial results which are obtained in functional diseases, and which are beyond question, not to the physical effects of the current, but to the psychological impression produced.

The power of suggestion to modify functionally-diseased states has been brought into prominent notice of late by the study of hypnotism, and the therapeutic results obtained by hypnotic suggestion have offered a new explanation of many of the phenomena obtained in every department of therapeutics. The inference was natural that the effect of electricity in functional disease might be due to suggestion pure and simple.

That the electric battery, and especially a static machine, can be made to have a powerful suggestive influence on a patient's mind is a fact that can be easily demonstrated. It is beyond question that the electric current, in many instances, acts in this way, and that some of the more brilliant cures are due to suggestion, and to suggestion alone. I have myself, again and again, made use of this suggestive influence, and obtained very striking results. In fact, whenever I wish to make use of suggestion for therapeutic purposes, it is my habit to employ the battery¹ as an agent. Very pretty experiments may be made in this way, showing the power of suggestion in the waking state, even without hypnotism. If any one doubts the suggestive power of many of our therapeutic agents, he has only to make a few experiments of this sort. That the results in such cases are due to suggestion cannot be doubted. It is possible to play upon the nervous systems of some patients as readily as in the hypnotic state. Susceptible subjects will experience just such feelings and be relieved of others, as the operator "suggests." One has only to assert boldly that the patient will experience this or that sensation, and, if the subject is a suitable one, the prediction will be fulfilled. If more evidence is wanted that these results are due to suggestion, it may be obtained by shutting off the current from a galvanic battery without the knowledge of the patient.

These facts are very important, and must be borne in mind by him who would form a sound judgment on the action of electricity.² The case of paraplegia cited on page K-46 may be referred to here. The cure, in this instance, effected by "electric suggestion," was literally so electrical as to seem to the patient to partake of the nature of a miracle.

But though the electric battery may be made to produce results of this nature, the same may be said of almost every other therapeutic agent, medical or surgical. The physician who, believing implicitly in the efficacy of his treatment, never prescribes a dose or applies a blister without giving positive assurances of the beneficial results that will follow, will always count a higher percentage of cures, when dealing with functional diseases and minor ailments, than the skeptical and timid practitioner. The electric battery is particularly well adapted to pro-

¹ The static machine is most effective for this purpose.

² The same may be said of many other therapeutic agents, such as blisters. Compare, for example, Harkins's cases, cured by blistering over the fourth and fifth cervical vertebræ.

duce a profound impression of this sort on the mind. But he is a rash generalizer who would infer from such facts that this is the only way in which electricity acts. A generalization of this kind rests on even less substantial evidence than that which attributes to the electric current the power to reorganize structures irreparably destroyed. One might as well infer that, because in given instances bromide could be shown to produce sleep by suggestion, it had no physical hypnotic effect. It may be said that electricity can act, and in many cases does act, by suggestion, but, with our present knowledge, more than this cannot be said.

On the other hand, it has been found that electricity does produce certain physical reactions in the body, and there is good reason to infer that it is through the medium of these reactions that the beneficial therapeutic effects in psychoses are brought about.

The physical facts, by means of one or more of which the therapeutic effects of electricity may be brought about, may be briefly described as follows :—

1. The compound group of phenomena known as catalysis.¹
2. Changes in the circulation of the brain and spinal cord, which have been observed to follow electrical stimulation of the skin. (Nothnagel observed contraction of the cerebral blood-vessels following electrization of the skin and of the sensory nerves. These results have been confirmed by Rumpf, who found that faradization of the skin of a limb caused transient anæmia, followed by congestion of the opposite hemisphere.)
3. Changes in the circulation of the brain, shown by Löwenfeld to occur in rabbits when an electric current is passed in different directions through the head. According to this observer, when the positive pole was placed on the forehead and the negative pole on the nape of the neck a contraction of the blood-vessels of the brain occurred, but when the poles were reversed a dilatation of the vessels resulted. When the poles were placed on the side of the head a contraction of the vessels lying beneath the positive pole was produced, and a dilatation of the vessels on the side on which the negative pole was placed.
4. More important than all, certain changes, as yet of an unknown nature, produced in the central nervous elements by reflex stimulation independent of the circulatory changes.

The effects included in this fourth class receive a certain explanation from what we know of the effect upon the body of reflex stimulation by physical agencies other than electricity. The readiness with which the central nervous system may be affected for good or for evil by different kinds of peripheral stimulation is a fact too well known to need reiteration, but the intensity of the effect that may be produced by such stimulation, even on parts of the nervous system not directly connected with the particular centripetal nerves acted upon, is apt to be overlooked in

¹ Catalysis was introduced by Remak as a convenient term to designate a number of complex physical effects of the electric current. They are thus summed up by de Watteville :—

1. Its property of conveying liquids from pole to pole (cataphoresis and osmosis) through the tissues, whether cell-walls or intercellular material.
2. Its property of inducing chemical changes in solutions through which it circulates (electrolysis).
3. Its effect on the circulation of lymph and blood through the tissues. This effect is (a) direct (by excitation of the vessels themselves); (b) indirect (of vasomotor or sympathetic nerves); (c) reflex (of sensory nerves).

To which list we may add (4): Its possible excitation of the trophic influence of nerves on tissues; and of their constituent cells themselves.

individual instances. Counter-irritation is a classical instance of such action. Heat and cold are capable of producing very profound effects upon the nervous system, whether in the form of douches, ice and hot-water bags, hydrotherapy, or the atmosphere. The undoubted beneficial influences of hydrotherapy can only be attributed to the stimulation of the peripheral nerves. The tonic and depressing influence of the atmosphere is a matter of such familiarity that it is apt to be overlooked; yet, when one pauses to consider the profound effect on the well-being of the individual, at times produced in a very few minutes by sudden changes in the temperature of the atmosphere, one can hardly help being astonished. An instance of this, which has probably been experienced by every one, is the tonic, bracing effect almost instantly felt when, after a hot day in the city, one feels the cool sea-breeze on a harbor steamer. The physical depression caused by the city's heat and day's work disappears as if by magic. The change is too sudden to be due to the cooling off of the body, but the feeling of well-being must be due to stimulation of the peripheral nerves. This is in line with what is known of the tonic, bracing effect on the nervous system of the cold air of high altitudes. It is generally conceded by writers on Alpine health resorts that this is one of the principal factors which give these places their therapeutic value.

The power of smelling-salts to relieve headache, remove faintness, etc., is too well attested to be doubted.

These commonplace facts are referred to here because they are similar in character to many of the effects produced on the central nervous system by electricity, and throw a side-light on its mode of action. I have frequently noticed, as has, probably, every observer, the same physiological phenomena after electrization. Patients often describe the same sensations of well-being, of increased energy, and of a sense of exhilaration while being electrized as from a cold douche or a sea-breeze, etc. It seems to me that these effects are best explained by stimulation of the peripheral nerves. Further evidence of this mode of action is the unfavorable effects sometimes produced. It occasionally happens that patients do not bear electricity well. In such cases various unpleasant symptoms are produced; headache, vertigo, faintness, various paræsthesiæ, pains, nervousness, and sleeplessness are experienced. These seem to be the direct result of the irritation of the nerves.

Rockwell says he has repeatedly seen the pulse-rate (in a case of neurasthenia with rapid pulse) reduced 40, 50, and 60 beats. I have seen the pulse fall 20 beats under similar conditions. Przewaski observed the temperature of one side of the face reduced from 0.5° to 0.175° C. by subaural faradization. This, as well as the fall of temperature of the skin between the third and fourth fingers on faradization of the ulna, was, however, probably due to contraction of the vessels. Weir Mitchell has demonstrated the rise of the general temperature of the body after general faradization.

Further direct evidence of the reflex influence of centripetal stimulation is the sweating sometimes observed following static electricity. The fact that peripheral irritations tend to diffuse themselves along other associated tracts that are in close connection with the nervous centres primarily stimulated may sometimes be observed in painful affections like neuritis. In a case of inflammation of some of the branches of the brachial plexus I frequently observed that the pain, after it had persisted for some time in an intense form in the original nerves, spread to the districts supplied by neighboring branches, then to the neck, side, and, finally, leg of the same side. This mode of propagation was very much like that of the discharge of an epileptic fit.

A curious though simple phenomenon of cutaneous irritation, and one which I have never before seen mentioned, is the following, which I have frequently produced on a certain subject: On scratching the skin on the outside of the thigh, a very intense, sharp, stinging pain on the same side of the body over the lower ribs has been felt. The pain is very sharply localized, and feels as if the skin were pricked acutely with a needle. It can only occasionally be excited, but on favorable occasions it is very easy to elicit it. This is evidently a reflex pain, due to stopping over of the stimulation to associated centres.

The exact mode in which electrical stimulation—as well as that of other agents—acts upon the central nervous system is, of course, hypothetical or unknown. But its influence evidently extends beyond the centres directly connected with the centripetal nerves. It undoubtedly has an inhibitory influence on associated centres, as in the suppression of pain and headache, and it seems to have the power to restore the nervous equilibrium, so to speak, when disturbed. It also seems to have the power to arouse into activity nervous centres which temporarily, from functional causes, have been dormant. Deeper than this it is not to be expected that we can go.

When, then, the effects of other forms of peripheral stimulation, a few of which have been mentioned above, are recalled, and when we bear in mind the immense number of cutaneous nerves that can be brought under the electrical influence, and the intensity of stimulation that can be obtained of the central nervous system, it is not so very surprising, after all, that electrization should be so effective a mode of stimulation.

PSYCHOSES.

Arndt was the first to make a systematic and extensive study of the effect of electricity in mental affections. The results obtained by him were of an encouraging character. A number of other observers, for the most part in Germany (Schule, Morel, Emminghaus, Benedict, and others), have reported cases which were cured by electricity. On the whole, the results achieved thus far have given promise that in electricity we have an agent capable of influencing beneficially a certain class of

cases of this kind. The method has not, however, been as systematically pursued as it should be. Whether it is that the helplessness of attempting to effect the graver forms of mental disease by such an agent has thrown a damper over the courage of the alienist, and produced a skepticism regarding the possible curative influence in the lighter cases, even in their earlier stages, or whether it is that alienists, as a general rule, have not that familiarity with the use of electricity which would stimulate them to more systematic trials, while electrical therapists are not sufficiently often brought in contact with cases of psychoses,—whatever be the reason, the treatment of these affections by electricity has not been pursued as systematically as is desired. The observations thus far made, although there could be many of them of a favorable nature, have been comparatively scattered and limited. Erb wrote, in 1887: "We have been unduly backward with regard to the systematic and extensive employment of the electric current in one group, and that one of the most important of cerebral diseases. The psychical affections have, until now, been subjected to electrical treatment very seldom, and in a manner that has been quite insufficient." The same statement is true to-day; in this country, at least.

It may be said, however, that it is not in asylums that cases will be found suitable for this kind of treatment. Cases sufficiently grave to be committed to asylums are generally too far advanced or too serious to be affected by electricity. It is rather in the lighter or border-land cases that favorable results are likely to be obtained by this mode of treatment. And yet quite a number of cases of a severe type have been reported in which the curative effect of electricity was quite marked. Referring here only to some of the later observations, mention may be made of a series of eleven cases (ten being of melancholia), carefully observed and reported by Wigglesworth,¹ in three of which a cure resulted under treatment by galvanism, and two were thought to be benefited. Of the three cases discharged cured, one had existed over two years previous to treatment, and was convalescent in about forty days, after sixteen sittings. The author concludes, as a result of his experience, that the use of galvanism is followed by good results in selected cases, which might otherwise drift into hopeless chronicity. He believes that mental stupor, torpor, melancholia, and acute dementia are particularly benefited by galvanism. These cases by themselves, without additional corroborative testimony, are hardly sufficient in number, nor were the results sufficiently brilliant (judging by the report) to justify the conclusion that galvanism was the active agent in bringing about the final result. There is, however, more testimony bearing on the point, which, though scattered, is of value.

A very remarkable case is one reported by Robertson. It was a case of melancholia, with delusions of suspicion, for which the patient,

¹ *Journal of Mental Science*, No. 33.

a woman 50 years old, was committed to an asylum. Imaginary voices affected her very much, and in time she refused food so that she required feeding by the stomach-pump. In October, 1882, when galvanism was begun, her condition was worse than when she entered the asylum, fifteen months previously. Up to this time she had been insane seven years. After the third application she began to improve, and in the following March was discharged cured, but it was noted that she had been free from symptoms for two months. A current from 15 to 20 cells was used. The patient was so convinced of the benefit derived from the battery that she asked to have her hair cut very short in order to get the full effect of the current. She attributed her recovery to the battery.

Erb, in his hand-book of electro-therapeutics, has given a summary of the observations, mostly favorable, of Arndt, Benedict, Neftel, Franz Fischer, Tigges, and others, to which the reader is referred. It is folly, however, in spite of occasional brilliant results, to expect to find in the electric current an agent which can be relied upon in the severer psychoses. We could hardly expect better results than those obtained by J. Morel¹ in melancholia, mania, paranoia, and dementia. Electricity had but slight effect in these cases, excepting that in 15 out of 96 cases of melancholia the results were very good. In 16 others they were less gratifying, while in the remainder there was no, or only temporary, improvement. As has already been said, it is only in the initial stages of the milder psychoses that electricity will have a favorable influence. More promising are those cases where various psychical disturbances are engrafted on other co-existing physical states, such as neurasthenia, hysteria, epilepsy, traumatic psychoses, etc. Cases of this kind are very numerous, and come under the observation of the general practitioner and the neurologist rather than the alienist.

It is not possible, with our present limited experience, to define, except in a very general way, exactly what cases are benefited by electrization. Examination of the literature shows a heterogeneous assortment thus far reported, and further systematic observation is necessary to determine what class is likely to be favorably influenced and what class not. Melancholia sometimes, even in a severe form, has been frequently cured, and some cases even of primary dementia have given favorable results, but the latter must be regarded as exceptional. Although all kinds of insanity have been treated, it is absurd to expect electricity to influence such diseases as mania, general paralysis, secondary dementia, paranoia, or melancholia in its severer forms. But milder psychoses, conditions which may be supposed to be dependent on neurasthenic conditions, various functional disorders, such as impaired nutrition, derangements of circulation, or a morbid association of ideas may often be cured, even though hallucinations, delusions, etc., be present. The results of observa-

¹ "L'electro-thérapie dans les Maladies Mentales"; Bull. de la Société de méd. ment. de Belgique, 1889, Ma., Nos. 52, 27.

tions, thus far made, indicate that it is desirable that a more extensive trial should be made of the treatment by electricity of cases of this kind. The field is a promising one. As Erb says, "A general survey of the observations, with regard to the electro-therapeutics of the psychoses, which have been made up to the present time, shows us that the psychoses can, in certain cases, be favorably influenced and sometimes cured by the electric current, even in cases in which all other possible remedies have long been tried in vain."

The writer has made no attempt to treat with this agent the graver psychoses, such as are suitable for asylum care, but has had considerable experience with the lighter forms. The results have been satisfactory, particularly when the psychical symptoms were the manifestations of other physical conditions. Such patients, it is true, were not strictly insane, but the psychical symptoms were sufficiently prominent and persistent to create a distinct psychosis, for which the patient sought treatment. The following are examples of the class of psychoses likely to be benefited:—

Personal Observation 1.—Mrs. D., aged about 42 years; ill for two years. Fixed idea that certain persons have hypnotic influence over her, and that she influences others. Interprets every action of others, including strangers, through this idea. Cannot ride in horse-car or go to church in consequence of hallucinations of vision; sees faces of certain individuals. Insomnia, general neurasthenia. Out of bed only three or four hours a day. Mental depression. Various perverted bodily sensations, such as pain, etc. Treatment: Static electricity three times a week. Improvement immediate. Slept well; hallucinations gradually disappeared. Fixed ideas less insistent and less constant. At the end of about two months patient could work greater part of the day, and, though not strong, could do much. Insistent ideas present only when tired, and in mild form. [Patient discharged, partly because nearly well and partly because it was not practicable to continue treatment. She had been sent to me by one who had had a large experience in asylums, with the prognosis of a hopeless case, and prophecy of early commitment to an asylum.]

Personal Observation 2.—Mrs. W., aged about 40 years. As a result of experimenting with spiritualism and mediums, had developed a psychosis. Against medical advice she had tried to develop herself into a medium. Symptoms: Great mental depression (melancholia); hallucination of visions; insomnia; insistent ideas; local pain. Treatment: Static electricity. Improvement began at once and continued. Cured after about three weeks' treatment.

Personal Observation 3.—Mr. D., aged about 45 years. Subject to ambulatory epilepsy. Medical advice sought by his wife because of melancholia and suicidal impulses. Depression marked. On first appearance he was the picture of misery. Although formerly an active business man and full of energy, he had become unable to perform any business, etc. Insomnia. Treatment: Static electricity. Improvement immediately after first sitting. After about ten sittings, well.

Symptoms which have essentially a psychical origin, whether they be pain, paræsthesia, insomnia, or many of those strange, "queer feelings in the head" or elsewhere, which patients find great difficulty in describing, are, as a rule, favorably influenced by electricity.

TECHNIQUE OF TREATMENT.

The customary method is to apply the electricity to the head, although it is recommended by some to galvanize or faradize the spine

and "sympathetic" and peripheral nerves. Minute rules have been given by German writers governing the use of the different poles and the duration of the current. For example, it is laid down by Arndt that when well-marked irritation is present the descending current should be employed,—that is, the anode on the head, the cathode peripherally; but if a state of depression or torpor exist, the ascending current should be used,—the cathode on the head, and the anode peripherally. In other words, if an exciting action is desired, the cathode is selected, and if a sedative the anode. Löwenfeld goes one step farther, claiming, as a result of his experiments on rabbits, that when the anode is placed on the nape of the neck and the cathode on the forehead,—the ascending current,—the vessels of the brain are dilated and the circulation accelerated, while, if the electrodes are reversed and the descending current used, the vessels are contracted and the circulation retarded. Therefore, when a state of hyperæmia is present, the anode should be placed on the forehead and the cathode on the nape of the neck, and *vice versa*. But granting the applicability to the human brain of results obtained in experimenting on rabbits, an inference of which the questionability has been pointed out by Erb, we know too little of the condition of the circulation in psychoses to make these physical principles of any value. But even Erb, who perceives the flimsiness of the evidence on which rules of this sort are based, cannot quite free himself from the force of authority, and so his work on electro-therapeutics is in many places a painful exhibition of the struggle of a scientific mind to reconcile the traditionally accepted and pleasing, but imaginary electro-therapeutics of his predecessors with what is really known of the action of electricity on the body in health and disease.

Now, supposing a condition of anæmia or hyperæmia to be present in melancholia or dementia, have we any means of determining what relation this supposed condition of the circulation bears to the disease itself, whether that of cause or effect, or whether influencing the circulation would influence the disease? Similar questions may be raised as to the use of the anode and descending currents to produce sedative effects, and *vice versa*. I do not question the fact that the physiological reactions of the two poles in some respects differ, and that occasionally results are obtained with one pole that the other pole fails to give; but the physiological reactions furnish no basis, and the therapeutic results a very slender one, for any system of treatment of this kind. In the great majority of instances one pole is probably as effective as the other, and where there is a difference it may, perhaps, be explained by a difference in the intensity of the action. With a few exceptions, with a current of the same strength, the cathode has more intense action than the anode; but if the current be decreased while the cathode is the active pole, the intensity of the action will diminish till it equals that obtained with the anode with the original current. The supposed sedative action of the anode may be due to its quantitative and not qualitative effects. In

peripheral electrization the reason for this becomes plain when it is remembered that it is probable that the principal mode by which electricity acts on the central nervous system is reflex through the afferent nerves. It is the excitation of the nerves which brings about the central changes; this means that it is neural molecular motion, and not that form of molecular motion which is known as the electric current. Now, obviously, we should *a priori* expect that it would be a slight matter whether this neural motion (current) were excited by a positive or a negative anode, or an ascending or a descending electrical current. When Rumpf found that faradization of the skin produced contraction of the cerebral vessels, the immediate agent was the neural current in the afferent nerves, and not the electrical current.

Turning from these theoretical considerations to practical experience, it seems to me that these views find ample confirmation in the equally successful results obtained by different and opposing methods. One hesitates to throw overboard the experience of other observers without weighty evidence, but I must confess that, allowing for this difference in the intensity of action of the two poles, my own experience has failed to convince me of a difference in the quality of their therapeutic effect. Erb speaks with great caution in the matter, and, although believing in a difference in the polar action, admits that our use of them must be largely empirical; and de Watteville, whose discussion of the subject is by far the most scientific and sensible that has yet appeared, is still more skeptical. Until, however, the matter has been settled one way or the other, many physicians will prefer, as de Watteville advises, "to observe up to a certain point the polar dictum," and use the positive pole when a sedative effect is desired, and the negative when a more exciting one.

The pathogenesis of many psychical affections is too obscure to allow ourselves to be governed by theoretical physiological principles in using electricity. The formulae of electro-therapeutics rest only on empirical data, and the best methods are those which experience shows give the best results. While different observers have their preferences, equally good results seem to be obtained irrespective of the direction of the current or the pole used. As de Watteville expresses it, "The position of the pole in therapeutic applications is to be governed chiefly by physical principles; it must be such as to secure the most complete permeation of the organ or tissues to be influenced by the current."

In applying galvanism to the head, my own method is to try and saturate, so to speak, the whole brain with the current, unless there is a specific reason for localizing it on a special region. With this end in view, it is passed longitudinally from forehead to nape of neck, and longitudinally through the temples or parietal regions. I use a current as strong as can be borne without producing vertigo, beginning with 0 and gradually increasing to this limit without removing the electrode from the skin. Before removing the electrode the current is gradually

diminished. Shock must be avoided. A sitting should last about ten minutes.¹ An electrode covering the head in the form of a cap may be used, the other electrode being applied to some other part of the body. When the *faradic* current is used it is not necessary to use the same precautions in regard to increasing or decreasing the current when applied to the head. This current is considered by some to be more stimulating and more efficient in cases of stupor or depression.

Galvanization and faradization of the peripheral nerves are strongly recommended by Arndt, who used this method principally in his earlier observations. For this purpose general electrization, after the method of Beard and Rockwell, may be used as described on page K-59. This should be particularly serviceable when neurasthenia exists. It is very refreshing and stimulating when properly done.

To obtain the best results with electrization considerable judgment and skill are essential, especially with the class of cases we are considering. It seems to be a very simple matter, but experience, in this as in everything else, is a great advantage, and he who possesses it will obtain results which another will strive for in vain. Some persons—neurotic subjects—are very sensitive to electrization, and when it is carelessly done unpleasant consequences are likely to ensue. I have seen this illustrated in more than one individual, who, though affected most favorably by electrization, developed most disagreeable symptoms if I became careless in applying it. I have used *static* electricity in the mild psychoses with marked success. This form has the advantage that it can be applied to the head and the body without the inconvenience of removing the clothing. For the head the static douche, or breeze, is most advantageous. Many unpleasant symptoms are readily dissipated by it. Mental depression and insomnia often yield after a few applications. Local symptoms in different parts of the body, but of a psychical origin (pain, paræsthesia, etc.), can sometimes be suppressed at once. For this latter purpose a mild spark is best. It is not necessary to have sparks stronger than can be borne without effort, but when the local distress is severe it is often surprising to see how strong shocks a patient can bear, and even court, without flinching. A well person will rarely endure so much. For methods of using static electricity, see article on that subject (A-84) in this work. For mental depression and other psychical symptoms, I would recommend allowing treatment with head douches for a relatively prolonged sitting,—say, twenty minutes to half an hour. Finally, it may be said that individual symptoms in the psychoses, when suitable for electrical treatment, are to be treated as in other diseases.

¹ The rules given by some writers are absurdly cautious. One or two minutes and 2 or 3 milliamperes are stated to be the limits of time and strength. Excepting in individual cases, which exhibit great sensitiveness, these are unnecessarily small. Rockwell speaks of having given 33 milliamperes. The best guide is the sensation of the patient. A current less than that which will produce vertigo is safe. I have never seen any reason to think ten minutes too long, nor that this time might not be prolonged, but it is true that over 4 or 5 milliamperes will usually, not always, produce vertigo or other disagreeable symptoms.

Regarding the *choice of the different varieties of electricity*, static electricity certainly has more suggestive influence than other varieties, but whether it is more effective in other ways may be doubted. I am inclined to think, though, that a static spark is most effective in psychoses in relieving pain located in distant parts of the body, but of a psychical origin. Still, sometimes one variety is most effective and sometimes another, and it cannot always be determined without trial which will prove the most suitable in a given case. But for application to the head experience seems to have shown that galvanism or faradism is most efficient in the great majority of cases. It is well to begin with one of these, and then, if the results are not satisfactory, to shift to one of the others. It is even well, during the course of prolonged treatment, to change from one to another, as we would change in medicinal treatment from one tonic to another. For electrization of the peripheral nerves for purposes of stimulation, faradism is usually the more effective. It is particularly important, when using general faradization, not to use a strong current. A general stimulation of large surfaces and many nerves produces much more favorable effects. To relieve local pain, such as a painful spine, galvanization or faradization should be selected.

HYSTERIA.

The results of the electrical treatment of hysteria are very uncertain. Sometimes very brilliant cures are met with; at others, hysteria is as rebellious to electricity as to everything else. This difference depends in part upon the varied character of hysterical affections, and in part upon wholly unknown factors. Some writers claim that electricity has a specifically favorable influence in hysteria; others, like Erb and de Watteville, that it is very unreliable. This diversity of opinion depends largely upon the difference of view as to what shall be classed as hysteria. In cases where the symptoms may be properly classed as hysterical and symptomatic of, or a complication of, some other disease, electricity may justly be said to have a beneficial influence. It is well known that even in organic disease many symptoms of a functional (hysterical) nature may be superimposed upon those due to the primary disease. In neuritis, for example, or cerebral hæmorrhage, an anæsthesia may be added of a purely functional nature. In other cases, a localized paralysis may become widely distributed over other parts from the same reason. In neurasthenia many of the symptoms may be purely hysterical, and may be so marked as to mislead us as to the true character of the disease. Anæmia may present a variety of hysterical symptoms, which may overshadow the true pathological conditions present.

Sometimes it happens that an organic disease, such as a neuritis or an arthritis, turns into an hysterical affection of the same parts, in which case the transition is often overlooked until a sudden cure takes place to the surprise of the physician. For example, I recall a severe case of in-

inflammation of the brachial plexus, causing paralysis and atrophy of the muscles supplied by the nerves. At the end of about eight months there was no improvement of the paralysis, but loss of power appeared in the other arm. One day, in a fit of emotional excitement, the patient threw up her arms, and she was cured. All the symptoms of neuritis (pain, glossy skin, atrophy, etc.) had been present in the arm originally affected. The neuritis had healed without the fact being suspected. A student received an injury to the knee from a fall while playing foot-ball. There was no abatement of the symptoms during several months, until one day he threw away his crutches and walked off well.

Organic injuries of one part are apt to induce functional disturbances of other parts. Hysterical neuralgias are very common accompaniments of various diseases. A mild neuritis of the arm was accompanied not only by excruciating pains of the same limb, but also by pains in the neck, side, and corresponding leg. The course of events showed all these secondary pains to be functional. Whether such conditions should properly be classed as hysterical may be questioned, though, as a matter of fact, in practice it is usual to find them so considered. The same is true of a great many minor functional disabilities, some of which, at least, I must consider as more properly belonging to habit neuroses, association neuroses, auto-suggestion, and what not, while others are hysterical psychoses.

Now, I think, it is within the limits of moderation to say that such minor affections as these, as well as the hysterical factor complicating other diseases, are, as a rule, readily cured by electrization. Hysterical neuralgias complicating other affections are often dissipated as if by magic. They often return, it is true, as long as the primary disease persists, but they are easily held in check by repeating the treatment. Narcotics and other drugs are thus dispensed with. It would seem that cases of this kind are very different in their pathology from those in which the physical defects present are but manifestations of what may, for want of a better name, be termed the hysterical diathesis. When this is present, underlying the paralysis, or anæsthesia, or convulsive seizures, there seems to be a morbid condition of the nervous system, of which these stigmata are the symptoms.

Given a case of hysteria of this kind, it is pretty safe to count upon its being rebellious to all electrical treatment. By this I mean cases of monoplegia or hemiplegia of the Charcot type, with implication of the special senses; cases of hystero-epilepsy, ataxia, hysterical contractures, joint disease, and of hysterical hemianæsthesia. In each of these diseases the type is well and sharply defined, so that it may be classified as specifically and distinctly as pneumonia or typhoid fever. Such cases are difficult to cure by any mode of treatment. This is particularly true of paralysis, etc., due to traumatism, especially when litigation is in progress. And yet it sometimes happens that individual

cases rapidly improve under electrization, while others quite obstinately resist.

In illustration of this last statement the case of a young girl who was paralyzed in consequence of a blow on the top of the head by a piece of shafting may be cited. An hysterical paralysis, with anaesthesia of the left leg, of moderate intensity, developed. The left hand was also weaker than its fellow. The special senses on the left side were affected, and the field of vision was also much contracted for colors, as well as for white light. Under electrization the patient improved, and in a short time was practically well. Another case of hysterical paralysis of the muscles of the back following a fall was much improved after a few sittings, though she returned to her home in the country before the cure was complete. But in contrast with these favorable results other cases might be given where no benefit whatever was derived.

It almost seems as if some cases of hysteria, especially monoplegia of the Charcot type, waited until they were ready to get well, and then got well of themselves. Such kinds of hysterical paralysis may persist for years. I have known three cases to persist for twenty-five years with little change.¹ Because of the suddenness with which cure sometimes takes place in hysteria the impression is current that this is to be expected ordinarily. This is a mistake. As a rule,—at least, this is the writer's experience,—hysteria yields gradually to treatment like other affections. The general physical condition needs to be treated as much as, if not more than, the motor and sensory phenomena. The strongest moral influence must be brought to bear, and unhealthy mental surroundings removed. Isolation from home and friends, in most cases, is all-important. As an adjunct, electricity is often of service, and sometimes its effects in dispelling local stigmata are striking. In applying electricity for the cure of hysteria, it is important to use it so as to obtain a powerful moral effect; that is, suggestion plays an important, if not the principal, rôle in producing the cure; as witness the well-attested cures effected by metallo-therapy, as well as many of the phenomena produced in hysteria by magnets. A wooden magnet is just as effective as a real one. Some curious experiments illustrating the force of suggestion were made by Babinski²:—

Two hystero-epileptic girls, each of whom presented hemianæsthesia, were seated back to back, and then a magnet was placed upon the arm of one of them. In a short time one of the girls was entirely wanting in sensibility, while the other recovered it. Afterward the conditions were reversed, and there followed a series of oscillations. The hemianæsthesia quickly returned to both girls upon their being separated. The transfer from one to the other took place more quickly if the backs of the patients touched, but also took place when there was a distance between the two. A paralysis, induced by suggestion, in one of the hysterical patients could be transferred to the other by the method above described. The same was found to be true of coxalgia, dumbness, and a somnambulistic condition. When patients who had come to the hospital with an hysterical paralysis not arising from

¹ Amer. Journal of the Med. Sci., 1892.

² Progrès Méd., xiv, 47, p. 1010, 1886.

suggestion were seated back to back with one of the hysterical individuals just mentioned, who was in a somnambulistic condition, and the magnet was applied, the corresponding paralysis of the former appeared in the latter, even although the former remained paralyzed.

It would be easy to multiply the evidence of the suggestive power of electricity in hysteria, if it were necessary. It is not entirely, however, by suggestion, that electricity acts. The local shock, or peripheral stimulation by itself, is equally capable of removing hysterical manifestations. For instance, in one case I accidentally, and contrary to my purpose, caused complete anæsthesia of the hand to disappear by means of the electric needle. I was experimenting for another purpose, and was not myself prepared for the unexpected result, nor was the patient. The consequence was, the experiments could not be carried out. It is well known that a local shock from other means—as, for example, the actual cautery, a cold douch, emetics, etc.—will sometimes cure hysterical symptoms. Just as powerful irritations will cause hysteria, so they may cure it. A wise physician will, therefore, take advantage of all the therapeutic aid which electrical treatment offers in hysteria—of the mental as well as the physical impression; neither should be neglected. It is justifiable, as well as desirable, to attempt to arouse an expectant condition of mind in the patient as to the results that will follow. For this purpose it is imperative that positive assurance should be given of the result that will follow. The patient should be encouraged to regain the dormant will-power. The physician who is timid or hesitates is lost. It is well to persist at each sitting until some degree of improvement is manifested. Strong currents or shocks are, as a rule, more efficient than mild ones; it is therefore important to use as strong a current as can be comfortably borne, but it is not necessary or desirable to be severe.

Regarding the *choice of kind of electricity*, it will be found that sometimes one kind is more effective and sometimes another. Probably, as a rule, faradism is more efficient in curing motor defects and static in relieving sensory symptoms, although I am not aware that any systematic observations have been made to determine this matter. It is only possible to state a general impression, which has been derived from experience. The powerful muscular contractions that may be evoked by faradism render it particularly serviceable in paralysis. On the other hand, pain, paræsthesia, and anæsthesia are often more readily dissipated by static electricity. The awe-inspiring nature of a powerful static machine make it especially suitable for producing a profound effect on the mind of the patient.

Static electricity often gives successful results in the treatment of motor as well as sensory symptoms. Of late years this variety has been much used, and in a great measure has superseded the galvanic and faradic currents in the treatment of neuroses, largely because of the convenience with which it can be applied, and its adaptability to a variety of

different conditions. By means of Morton's electrode and method, it can be converted into the dynamic variety, and made to produce all the effects of faradism. In large hospitals, where many patients have to be treated, several may be placed on the same insulated platform and be treated at the same time, as is done in La Salpêtrière.

Some interesting observations, showing the effects of static electricity, have been published by Blanc-Fontenelle. Ten cases in all were treated, three or four being placed on the insulated stool at once. In four cases of anæsthesia (three of hemianæsthesia and one of complete anæsthesia) electrization quickly restored the sensibility, which, however, tended to disappear again. In the case of complete anæsthesia sensibility only returned to one side. After each sitting the anæsthesia in three cases disappeared, and then returned again after various intervals. The same phenomenon occurred after each sitting, and finally the sensibility was completely restored. Of two cases of amyosthenia (paresis) one sitting was sufficient to restore the strength of the affected hand, as measured by the dynamometer. Of four cases exhibiting hysterogenetic zones, pressure upon which readily produced convulsive attacks, in all but one these zones disappeared under static electrization, so that pressure failed to cause an attack. The author states that static electrization diminishes the disposition to contracture and sometimes makes it disappear. On the other hand, Eulenburg, in his table of cases¹ (embracing a variety of affections treated by static electricity) records seven cases of hysteria, none of which were cured.

This is a fair illustration of the varying results obtained in the treatment of hysteria by electricity, as well as by every other method. Even the rest-and-seclusion treatment of Weir Mitchell must testify to a similar record. The fact is—and it is a fact that must be recognized—that in no disease does the personal equation of the physician play so important a part as in hysteria. Some physicians, men of character and strong personality, will succeed with a given mode of treatment where others fail. No greater compliment can be paid to the force of character of certain physicians than that they have been able to apply with success the Weir-Mitchell treatment of hysteria and neurasthenia where others have tried it in vain. They are probably unconscious how much their own personality has to do with their success, rather than the treatment *per se*. The rest-and-seclusion cure is not a method that will succeed in any one's hand as a drug or the surgeon's knife will succeed in other diseases. It is a method that is peculiarly fitted for him who has natural gifts which will enable him to make use of it. In a great measure it is likewise with electrization. Certain persons will obtain successful results by electrization for hysteria, while others will not. The proneness of hysterics to respond to suggestion, conscious or unconscious, makes this easily intelligible. Unconscious suggestion on the part of a physician

¹ Deut. med. Wochenschrift, March 1, 1889.

is as important an element as that which may be given deliberately, and must be guarded against. The effect of electricity, tonics, rest, and everything else may be undone by thoughtlessness on the part of the physician, as well as of the nurse and friends. Many a patient has been kept an invalid for months, if not years, by this subtle influence. The mere tacit assumption of the physician that nothing can be done to improve the patient's condition, or the sympathy of friends who bewail the patient's sufferings, may be sufficient. In some cases nothing has a more injurious effect than forbidding the patient to do certain things for fear of increasing the symptoms. Acts which bring on discomfort are apt to be interdicted, instead of the patient being encouraged to persist in them until their ill-effect disappears. In this way hysterical-habit neuroses are created which are difficult to break up. The power of the will to control the body, as well as all automatic processes of inhibition, become lost. The patient must then gradually learn to regain this.

On the other hand, in hysteria unconscious suggestion may work for good, as when the physician, believing firmly in some simple remedy, unwittingly gives a powerful suggestion of cure. The already-cited examples of metallo-therapy and magnets, to which may be added such quackery as Perkins's points, are illustrations. Care, then, must be taken not to undo the good gained with electrization by injudicious management of the patient. The patient must be encouraged to hold every little that is gained, and must be convinced that she can if she will. I do not speak of adjuvant treatment, such as rest, seclusion, and forced feeding, as they are not germane to this subject, and it is to be understood that they will be employed when necessary.

Electrization may be applied *generally or locally*. It is usually desirable to tone up the general system, with the view of removing the general hysteric "diathesis," upon which, in many cases, the local manifestations depend. As long as this continues, there will be relapses, or the local outburst is liable to take on some other form. Besides the usual therapeutic methods for this purpose, general electrization, either in the form of faradization or franklinism, is of service. Before and after the local application the patient may be given a thorough treatment of this kind. If static electricity is used, the head douche, followed by mild sparks or the breeze, to the remainder of the body should be given for twenty minutes to half an hour. This will usually be found to have a refreshing and invigorating effect.

Locally, electrization is applied to remove individual symptoms. The paralyzed, anæsthetic, or painful part is then treated directly. When cerebral symptoms are present, they are to be treated as described under "Psychoses." When the hysteria is strictly local, whether as a paralysis or a sensory neurosis, a few applications of electricity to the seat of the trouble oftentimes dispel it entirely. In such cases the hysterical affection is apt to be merely the residue of some other foregoing affection, or

a complication of another co-existent but distinct disease. Where, however, there is present a deep hysterical diathesis which is the basis of the local defects, the latter have a tendency to return after they have been removed, as has just been pointed out, or else the hysteria shows itself in some other form. Therefore a cure cannot be established without the restoration of mind and body, as a whole, to a normal, healthy condition. Meanwhile, it is advisable to remove, if possible, the local stigmata, as thereby the cure of the general diathesis is facilitated. The complete cure of grand hysteria is pronounced by some to be impossible. This is unquestionably going too far, though it may be difficult to effect a complete cure, for, as Gowers says, many hysterics have been restored sufficiently to health to lead useful lives.

The manifestations of hysteria are so numerous that it is impracticable and hardly necessary to consider the treatment of each. A few only of the more important will be here referred to.

Hystero-Epilepsy.—It is stated that faradism will cut short and prevent an attack. One electrode may be placed on the spine, the other to the sole of the feet, or one on the back of the neck and the other on the epigastrium, as recommended by Didier, who considers faradism one of the best means at our disposal. Charcot recommends galvanism to the head for the same purpose. The current may be made and broken several times, due care being used. Richet and Roux succeeded in cutting short attacks by this method. Trouvé used a strong galvanic current (40 to 50 cells), with sudden reversals, with similar effect. Static electrization is used at La Salpêtrière for the purpose of curing this form of hysteria. Several patients are placed upon the insulated stool at once, and charged simultaneously. The effects are said to be favorable, and to influence the general habit, as well as to cut short an attack. Charcot states that, after static electrization, pressure on the hystero-genetic zones ceases to produce an attack. The results of Blanc-Fontenelle have just been mentioned. He found that, whereas, in certain cases, the lightest touch to these zones produced a convulsive attack, after the application of static electricity the strongest pressure failed to do so. When electrization fails, resort must be had to one of the other numerous methods of treatment.

Anæsthesia.—The faradic and static forms are the most serviceable. There are several ways of using faradism. The wire brush is the most effective electrode, as it causes the most intense stimulation. The whole anæsthetic area may be brought under its influence, according to the method of Rumpff, who has advocated the electrization of large surfaces, with the idea of acting on the central circulation, which, as he has shown, is modified by such peripheral stimulation. (Page K-28.) Another method is to concentrate the stimulation on a circumscribed region, according to the method advocated by Vulpian, who found that faradization of the skin of the forearm on the anæsthetic side caused a return of the sensi-

bility not only to the part faradized, but over the whole corresponding part of the body. There is no reason to suppose, however, that there is any specific relation between this portion of the skin and the sensory centres, as faradization of other regions, and even of sound portions of the body, will accomplish the same result.

It is an interesting fact, however, that strong, localized faradization will remove not only anaesthesia of the part, but of distant portions of the body. How much of this effect is due to changes in the central circulation, how much to reflex nervous processes independent of the circulation, and how much to psychical influences, it is impossible to say. Probably it is due at one time to one of these factors, and at one time to another, or to all three.

Static electricity is probably equally successful in restoring sensibility. It is to be applied in the usual way. In France *franklinism* is applied as a powerful aesthesio-genetic agent. Charcot, who was among the first to study its action, found that anaesthesia could be transferred from one side of the body to the other, and finally dispersed for good. Vigouroux has also had favorable results. Although there is a tendency for the anaesthesia to return, yet, even when this is the case, a patient can be kept nearly free from anaesthesia by repeated applications,—not an inconsiderable aid to a final cure.

Galvanism is also not without influence. Whatever form of electrization is adopted, it is, as a rule, more effective when powerful currents or strong sparks are used.

As has already been said, there is a strong tendency for hysterical anaesthesiae to return. In such cases the general "diathesis" must be treated on commonly-accepted principles. Electrization should, however, be persisted in, and the anaesthesia removed as often as it returns. In many cases it will be found that, after a number of sittings, it will disappear for good. The practitioner must always be prepared to meet obstinate cases, upon which the effect of electrization will be absolutely *nil*. Among them will be many traumatic cases, which will positively refuse to get well as long as litigation and other sources of auto-suggestion persist.

Paralysis.—The behavior of paralysis to electrization varies greatly in individual cases, as has already been said, and it is difficult to predict beforehand the result. Some cases are cured rapidly; some slowly, after repeated sittings; some are uninfluenced. It is always worth trying.

Aphonia may often be removed at a single sitting. On the other hand, as is likewise the case when a cure is effected by other means, there is a tendency for it to return. One reason for this is that it is really but the expression of an hysterical state, and as long as this latter persists the aphonia is liable to appear. In one sense it is not a true paralysis, but is rather an inability to use the laryngeal muscles for a particular purpose,—phonation,—while the acts of coughing, and some-

times singing, which equally depend on the action of the afflicted muscles, can be performed. In other words, the power of contraction *per se* is not lost. The affection more properly belongs to or approximates another type,—that of ideational paralysis,—which will be presently spoken of.

For the treatment of this paralysis faradization is the usual method. Both poles may be placed externally on the larynx, or, if this is not sufficient, a laryngeal electrode should be inserted within the larynx and the other placed externally. More technical skill is required for this. Weir Mitchell recommends instructing the patient to take a deep inspiration before speaking, when there is a lack of co-ordination between the laryngeal and respiratory muscles. By this means the patient is helped to once more resume volitional control over the necessary co-ordinated movements.

There is another form of paralysis, which was first described by Russell Reynolds,¹ and which, although not identical with, is allied to that due to hysteria; it may be designated as

Ideational Paralysis.—Paralysis is not the only form in which this neurosis appears. Other disorders, such as spasm, pain, paræsthesia, and various sensory disturbances often occur. Sometimes various minor psychical symptoms are met with, and give the impression of hypochondriasis or some form of hysteria. The pathology is always the same, and what is true of paralysis is true of the other forms of this disorder. Properly speaking, a paralysis of this kind is not true hysteria; but it is allied to it, and in practice it usually is diagnosed as of this nature. It will, therefore, not be out of place to consider it here. It is fairly common, but ordinarily its real nature is overlooked, so that its existence is not as well recognized as it should be. It requires some acumen on the part of the physician to distinguish it from true hysteria. The practical importance of doing so is that, unlike hysteria, it is readily curable, and electrical treatment is one of the most effective methods. If not recognized, it may persist for years. Its pathology seems to consist in the idea taking possession of the patient's mind that a given set of muscles cannot be used. All volitional control over these muscles has been given up by the patient. This surrender seems as if made voluntarily, instead of involuntarily, as in the case of hysteria, and often has its origin in some antecedent condition, such as traumatism. In such cases the patient's idea is a logical deduction from such real conditions, or has originated in some way by auto-suggestion. In every other respect the subject may be without a trace of hysteria,—in fact, may be perfectly normal in every way. Careful examination will fail to reveal other symptoms of hysteria, such as implication of the special senses, anæsthesia, emotionability, contractions, etc. Nor is there a tendency for a paralysis of this nature to return, unless the exciting cause persists, or

¹ British Medical Journal, November 6, 1869.

unless it occurs in a person who has the hysterical diathesis. In the latter case it may be impossible to distinguish it from true hysteria. Russell Reynolds, in his original description of the affection, in summing up its chief characteristics, says " (1) that some of the most serious disorders of the nervous system, such as paralysis, spasm, pain, and otherwise allied sensations, may depend upon a morbid condition of emotion, of idea and emotion, or of idea alone; (2) that such symptoms often exist for a long time, appearing as complicated diseases of the brain and spinal cord; (3) that they resist many different kinds of treatment, being alike unmoved by sedatives or irritants, by attention or neglect, but that they disappear on the removal of the erroneous idea; (4) that they occur independently of anything that can be called either insanity of mind, hysteria, hypochondriasis, or malingering; (5) that they are often, but not constantly, associated with some bodily weakness or general debility; (6) that they sometimes associate themselves with distinct and definite diseases of the nervous centres, so that it becomes very important to know how much of a given case is due to organic lesion and how much to morbid ideation; (7) that it is possible to make a diagnosis in regard to them in many instances; and (8) that the principles upon which their treatment should be conducted are simple and their application marvelously successful.

One peculiarity of this paralysis from idea is, that the subject can often use the affected muscles for one purpose, though not for another. There is a paralysis of movements, rather than of the muscles themselves. These movements are those involved in the particular idea that is at fault. For example, a subject while lying down may be able to move his legs in all directions, or to rise to a sitting position, although he may not be able to stand or to walk. The reason for this is apparent. This peculiarity was present in the following observation, which is a good illustration of the affection, particularly as the paralysis occurred under circumstances which gave every reason to suppose that we had to do with an uncomplicated focal injury to the spinal cord:—

Observation 1.—P. G. was originally admitted to the Boston City Hospital with fracture of the spine, causing paraplegia. After his discharge he was admitted to the department for nervous diseases. At this time his condition was as follows: He was only able to walk by the aid of crutches. He stood with difficulty, with his feet wide apart, and walked with hesitation and uncertainty unless supported. He stood with his knees slightly bent and his back thrown back, in a position difficult to describe. He complained of great pain in the lower part of his spine and buttock on sitting down, and therefore refused to sit while waiting his turn to be examined. There was apparently great weakness of the glutei muscles and of the extensors of the leg, for he had difficulty in raising himself to an erect posture after being made to bend over, and he carried himself with the centre of gravity thrown backward, so as to relieve these muscles. There was also difficulty in extending his lower leg.

The details of the examination of the reflexes, sensations, muscles, etc., are omitted here for brevity. At first the diagnosis was paralysis of the extensors of the leg and of the glutei muscles from injury to the cauda equina. This at first seemed clear, but when the patient was made to lie down, and the muscles were tested in that position, it was a matter

of surprise to find that he had complete control of both the extensor and flexor muscles of the thigh, as well as of the lower leg. The case was a puzzling one, and it was difficult to come to a conclusion in regard to the distribution of the paralysis.

He was examined twice with great care, with a view to studying the subject of spinal localization in the light of this case. As there was also marked toe- and foot-drop on both sides, with atrophy and loss of electrical reaction of the corresponding muscles, it was certain that there was present some serious injury to the nerves or cord; but it was difficult to localize it, or account for the peculiar distribution of the paralysis.

At his next visit it was not possible to examine him, owing to lack of time; but that he might not be disappointed at what might appear to be neglect, I directed that he should be given static electricity, and instructed to return for further examination.

After a few moments I went into the adjoining room, where he was being treated, and watched the process. Then, of a sudden, a sort of inspiration came to me, and in a commanding tone I ordered him to get off the chair and walk, assuring him that he was perfectly well and could do so. He looked at me incredulously, as if I were not in earnest. After some hesitation he obeyed. To his surprise, as well as ours,—for till this moment we had not suspected the true nature of his malady,—he got off the chair and walked around the room, incommoded only by a certain amount of foot-drop which he did not notice. Nothing was more ludicrous than to see him, as he walked about, staring at us in astonishment, his eyes as “big as saucers.”

Owing to the foot-drop, he raised his feet high in walking. He was told to leave his crutches and go home. He did so, and walked all the way to his residence,—a distance of several miles. At his next visit, two days later, he still retained command of the formerly paralyzed muscles. He, naturally, seemed to think a miracle had been performed.

In this case, then, there had been a combination of paralysis of the feet and toes, from organic injury to the cauda equina, with a large amount of functional paralysis involving the trunk- and thigh- muscles. The latter was dependent on idea. The origin of this ideational paralysis could be traced to a true, but temporary, paralysis of the same muscles following fracture of the spine, but which had cleared up. He was left, however, by the accident, under the dominant idea that he could not use his legs for certain purposes, and as long as this idea persisted he could not do so.

The following observation may also be cited:—

A lady was attacked with an ulnar neuritis while convalescing from the “grip.” She suffered from intense pain, which had nearly subsided when she came under my personal observation, about six months from the beginning of the attack. At that time there was marked paralysis of the hand, the use of which she had for the most part given up. She could not flex the fingers into the palm of the hand. There was tenderness of the nerves and skin, pain, and slight glossyskin, but there was no atrophy of the muscles or alteration in the electrical reaction. The diagnosis was mild neuritis, complicated by ideational paralysis. The latter was concluded as the result of cross-examination and a critical analysis of her history, which would be too lengthy to detail here. She was assured that the paralysis could be cured, but no opinion given regarding the pain, which was due to the neuritis. After the first electrization there was an *immediate* return of power to her hand. After a few sittings there was only a slight weakness, if any, left. The exact amount of strength could not be measured, on account of the tenderness which persisted. This also greatly improved under treatment, so that, when discharged, her disability was only slight from pain.

The course of events in this case was evidently as follows: In consequence of neuritis the patient suffers great pain, possibly some muscular weakness, and gives up all use of the hand. At first the patient cannot use the hand; later, without her being aware of it, the neuritis disappears, but the patient remains still under the impression that she cannot use it. She cannot will to use it, because of the strength of this idea. It requires a strong stimulus to enable her to regain power of the muscles. This was afforded by the treatment.

In the experience of the writer, most cases of ideational paralysis

have their origin either in some injury to a part suspending function or in some previous acute disease having the same effect. More rarely, in impressionable subjects, the affection can be traced to mimicry, or the effect of suggestion inspired by the presence of another person afflicted with a real disease. If litigation is in progress, no treatment will have any effect.

There are other methods besides electrization for curing this affection; for example, gradual education of the patient to resume control of the paralyzed muscles. It is not necessary, however, to go into these here. The method of using electricity is the same as for other forms of paralysis. The muscles must be made to contract energetically by powerful currents. It is often serviceable to induce the patient to make efforts to contract the muscles voluntarily in unison with the electrical contractions. All the muscles of the paralyzed part should be treated. Faradism is the most effective, but galvanism and franklinism can be used.

Hysterical *paraplegia* is generally regarded as very obstinate to electrical treatment. *Monoplegia* and *hemiplegia*, in the writer's experience, are also apt to be rebellious, but sometimes the result is satisfactory.

Contractures are not, as a rule, benefited by electricity. Cases of cure are, however, reported.

Neuralgia is more readily controlled by electricity than any of the hysterical stigmata. In fact, there is no method of treating this symptom that compares with electricity. Often pain will disappear like magic during a sitting. It is true that frequently it will return, but this is no valid argument against its usefulness. Pain, in itself, unlike anaesthesia and paralysis, is so great a source of suffering that anything that will suppress it even temporarily will be welcomed. In cases of some chronicity, especially when the hysterical symptoms are a complication of some other disease, the patient may be kept comfortable for months by daily electrization, when otherwise resort must be had to drugs, with all the attendant disadvantages. In a case, for example, of traumatic neuritis, with marked hysterical neuralgia as an accompaniment, the suffering was made endurable for a year, pending the settlement of the litigation. This relief was given not only to the hysterical neuralgia, but to that from the neuritis. In this case the pain was at times excruciating.

In a case of neurasthenic hysteria now under treatment, in which the principal suffering was produced by neuralgiform sensations in the head of great intensity, which had practically disabled the patient for five years, and confined her to her bed for three years, the patient has been kept fairly comfortable while she is undergoing the Weir-Mitchell treatment, and has been enabled to make efforts which otherwise would have culminated in severe attacks of pain and prostration. The result bids fair to be a success.

Spinal tenderness is often completely controlled by electrization, as

well as many of those pains in the back and legs supposed to be due to uterine difficulty. Static electricity is, on the whole, the most efficient form, as it is the most convenient. In the absence of an influence machine, the galvanic or faradic currents may be used. Sometimes one of these is the more efficient, and sometimes the other. Care must be taken, with sensitive subjects, not to use too strong currents at first. With each sitting the current may be increased, until finally a strong one can be borne. A strong current is more effective than a mild one, when the pain is intense. With timid subjects the galvanic current has the advantage of being less alarming. Whichever variety be used, the current or sparks, should be applied directly to the seat of the pain, and at each sitting electrization should be persevered in until some degree of relief is experienced. It will be very rare that the patient does not admit at least a diminution of the pain, if not total cessation. If the pain return the interval of freedom will probably be prolonged, and the pain will be rendered less intense by each subsequent sitting.

When using the faradic and galvanic currents one electrode should be allowed to rest on an indifferent part of the body, while the other is gently rubbed over the painful part without being removed from the skin. The current, at first mild, should be gradually increased until it becomes as strong as can be borne. With the galvanic current it is generally considered that the positive pole has a more anodyne effect than the negative. There is no harm in following this rule, though there is some reason to doubt the fact on which it is based. It is well to let the active electrode rest for a few moments over painful spots, until the current becomes unbearable.

NEURASTHENIA.

(PSEUDO-NEURASTHENIA.)

The opinion is generally entertained, by those who have had a large experience with electro-therapeutics, that many cases of neurasthenia are very favorably influenced by electrization (Beard, Rockwell, Erb, Rumpf, Fischer, Möbius, Arndt, Eulenberg, and others). On the other hand, the general practitioner, who is less familiar with this mode of treatment, either completely ignores these claims or exhibits an extremely skeptical attitude of mind regarding them. There must be some truth—perhaps some exaggeration—in each of these conflicting views. Between the extremes of confirmed faith and utter indifference there must be a safe middle ground on which we can stand. It may be stated at the outset that the effect of electrical treatment on that large group of diseases known as neurasthenia gives very varying results. For this reason it is impossible to make a general statement of its value which is applicable to individual cases. To appreciate this fact, it will be well to consider in a brief way the nature of the disease with which we have to deal.

The pathology of neurasthenia is obscure, but whatever be its nature, whether it be an autoethonous poisoning of the nervous system, as some would have us believe, or whether it be exhaustion of the nerve-elements, after the manner of the changes which have been shown by Hodge, in his experiments on birds and bees, to follow prolonged use, or other molecular changes such as would be produced by inanition, its symptoms and the laws of their development must be studied by themselves as clinical phenomena for purposes of intelligent treatment; just as in physical science the laws of electricity must be studied and formulated in the absence of an exact knowledge of the nature of electricity itself. And just as the fluid hypothesis of electricity was convenient for the time being for practical purposes, so it is desirable to have a working hypothesis of the nature of neurasthenia, as a basis for clinical study and treatment. That of exhaustion is the most convenient, as it contains no assumption of the nature of the finer changes that may be involved in the morbid process.

Adopting, then, this hypothesis for the purposes of this discussion, we should expect, on theoretical grounds, that in the practical handling of this disease we should have to do with a great variety of symptom-pictures, many of which would present very little external resemblance to one another. As the nervous system is made up of segments, each of which, though connected with the rest, is yet more or less isolated and capable of acting as an independent automatic centre, we should expect that any one of these segments might become exhausted by disease without the implication of distant or neighboring parts. It might be anticipated that, in this way, a variety of symptom-pictures would be produced which would have little external resemblance to one another, notwithstanding the fact that nerve exhaustion would be the physical basis of each. And, in truth, practical experience has shown that what is thus at first sight presumably true, is, in reality, the case. Clinical experience teaches that neurasthenia, at one time, may be expressed by a variety of more or less compact, localized symptoms, indicative of exhaustion of comparatively limited portions of the cerebro-spinal system, while at other times the exhaustion may be more disseminated, and include a very large part, if not the whole, of this same system. Neurasthenia may be expressed, for example, by any one, or by a combination of several or all of the following groups of symptoms, according to the part affected: Cerebral symptoms, indicative of mental weakness, fixed ideas, incapacity for work, etc.; headache, vertigo, nausea, asthenopia; cardiac disturbances; vasomotor changes; localized pains in the spine, limbs, abdomen, loins, sacrum, etc.; gastric disturbances, such as dyspepsia, flatulence, etc.; uterine and ovarian pains and other symptoms referable to the reproductive organs; muscular weakness, especially of the legs; disturbances of the sensibility (such as formication), subjective numbness, faintness and sense of exhaustion produced by

slight exertion; inanition and physical degeneration, and so on. This, of course, is only an incomplete classification of the possible symptoms. When neurasthenia is more or less generalized, all these disturbances of function may be included in the picture, in which case, of course, the exhaustion will be more profound. The degree of localization, on the other hand, may be from an almost isolated phenomenon, due to the limitation of the process to one or more nervous segments, up to almost general exhaustion. Where, however, the nervous exhaustion is limited in its extent, it nevertheless almost always happens that symptoms indicative of the implication of other parts, distant or neighboring, are included in the clinical picture, because of the physiological association between all parts of the nervous system. Experience shows that, even when exhaustion, as a pathological process, is limited to special segments of the brain or spinal cord, the disturbances of function observed point to the implication of more remote centres by an abnormal diffusion of normal nervous stimuli; or, if the term be preferred, by reflex influence. From this it will be understood that disturbances of function do not always indicate exhaustion of the nerve-centres as a physical basis; or, putting this truth in more general language, the *hypothetical anatomical exhaustion of the nerve-centres is not co-extensive with the disturbances of function (distribution of symptoms)*. In fact, the disturbances of function have a much wider distribution than the exhaustive process, and the phenomena presented by the disturbances of associated, but healthy, centres may be so extensive as to overweigh and obscure that of the primarily diseased centres. In such cases the disability will be occasioned almost entirely by the secondary disturbances of associated parts of the cerebro-spinal axis, while the diseased and exhausted focus will be of secondary consequence.

Another element, at least, in the production of these secondary disturbances, and one which profoundly affects the symptom-picture, is the deficient inhibition of lower centres by higher centres. When the higher centres are exhausted, they cease to hold the lower centres in check. The latter go on working of their own will, without heed to the proper regulation of the nervous household. "When the cat's away, the mice will play." Hughlings-Jackson, in his able article on the evolution and involution of the nervous system, has maintained with great force the division of the nervous system into three levels of evolution,—the lowest (spinal cord and medulla), middle (mid-brain), and highest (frontal lobes.) All parts of the body are represented at each level. In disease, according to the views of this author, there is a dissolution of the nervous system in a reverse order,—from the highest to the lowest centres. In disease—and this is a point of great practical importance, and one which has been frequently pointed out by Hughlings-Jackson—there are two sets of symptoms,—one positive and one negative. The negative symptoms are those due to the destructive action of

disease. The positive are those due to the normal working of the remaining unimpaired centres, usually of lower levels. When an aphasic swears, for example, his profanity is due to the normal physiological working of the only remaining uninjured portion of his speech-centre; the deliriums of fever or hallucinations of insanity are the expressions of the physiological workings of the remaining levels of consciousness, etc. This law, which Hughlings-Jackson has fortified with great force of argument and example, has special value in explaining many of the clinical phenomena of neurasthenia. The exhaustion of the highest centres gives rise to an inability on the part of the subject to perform certain mental and physical acts. But the lower and unexhausted centres act normally and physiologically, and give rise to phenomena which, because unusual, are regarded as pathological. The lower centres react in place of the higher or highest centres. If the latter were not exhausted, the lower would be inhibited, or quiescent. From this point of view, many of the symptoms of neurasthenia are really the expression of the normal or healthy centres, either from lack of inhibition or because of the exhaustion of the higher levels. They alone can functionate. Such functionating centres are not diseased, and the phenomena presented by their functionating are not to be taken as indicative of pathological processes located therein.

It is not the writer's intention to enter into a discussion of the pathology of neurasthenia; the object here is only to indicate the mechanism of the pathological process so far as is necessary to understand the conditions that must be met for purposes of treatment. The treatment cannot be intelligently undertaken unless the make-up of the symptom-picture of neurasthenia be understood. If these views be true, it becomes evident how impossible it is to make general statements of the efficacy of electricity, or any other agent or system of treatment that shall be applicable to all cases. We might predict from *a priori* considerations—in fact, we find it true—that electricity produces results in one class of cases of neurasthenia which are not obtained in another. When, for example, symptoms indicative of lack of inhibition or reflex irritation of associated centres predominate with only local exhaustion, the effect of electricity is likely to be more curative than when the opposite extreme is present, and when all the symptoms are due to a general exhaustion of the whole cerebro-spinal system, with imperfect nutrition and other forms of physical degeneration. In the latter case you could not expect to obtain curative results without first building up the body with food and improving the nutrition and increasing the amount of blood. In fact, it is in this last class of cases—in which inanition and anæmia exist, with their own train of symptoms—that the rest-cure of Weir Mitchell, with overfeeding, becomes necessary. But in these cases electricity is of use as a palliative. Many of the more distressing symptoms can be relieved and kept in abeyance by electrical treatment.

Insomnia and painful spine, headache, and similar disturbances are often kept under by means of electricity, and constant drugging is dispensed with.

The effect of electricity in neurasthenia, then, may be said to be (*a*) palliative and (*b*) curative. In most cases the palliative effect is obtained rather than the curative, but, nevertheless, there is a certain class of neurasthenics who may be said to be cured with electricity. And here another element may be referred to as influencing the effect of the treatment,—namely, the hysterical element. Hysteria, in one form or another, is very often associated with neurasthenia, just as, in hysteria, neurasthenia is superadded frequently as an additional factor. It is not often that we obtain a pure type of nervous debility. From a practical point of view, we may almost make a third group of cases, classified as hysteroneurasthenia or neurasthenic hysteria, according as the hysterical or neurasthenic symptoms predominate. Electrical treatment of these cases effects results which cannot always be obtained in the pure types. It may be that the hysterical symptoms will disappear, leaving a pure neurasthenia, or the asthenic symptoms may clear up, leaving the hysterical only behind.

The great difficulty in practice is to determine what class of cases is most likely to be benefited and what class not. Speaking generally, it may be said that the most favorable cases are those in which the nervous exhaustion is well localized and the symptoms are for the most part due either to defective inhibition or to secondary reflex processes. The effect of treatment is also likely to be more favorable when the case has been of short duration, the physical condition of the body is good, and the nutrition is not impaired. The least favorable cases are those with neurotic antecedents of long duration, and in which, from the long continuance of the neurasthenic conditions, the nutrition of the body has become impaired and the disturbances of function have existed for so long a time that they have become engrafted almost as automatic, independent processes. There are neurasthenics who may almost be said to be born neurasthenic, to live neurasthenic, and die neurasthenic. Such may be improved by this or that treatment, or they may have their lives made fairly tolerable by careful regulation of habits, and be relieved from time to time of any prominent symptom. Electricity will help these from time to time, it may relieve them from this or that thing from which they suffer, but it will not cure them. Such persons may be said to go through life like an old doctor's rickety buggy,—always worn out, always rattling and creaking, but never completely breaking down so as not to go at all. Another less severe type of cases may be decidedly benefited, if not cured, by electricity. This agent is a great help in their treatment; it palliates; it will relieve many of the distressing symptoms, and thus ward off the effect which constant suffering has in retarding recovery; while good food, fresh air, and exercise do the rest

and effect a cure. In the more local forms of neurasthenia electricity often produces the most brilliant results. Sometimes even a few sittings will not only dissipate most distressing symptoms seemingly like magic, but will do so permanently, and enable the patient to be discharged cured. Such cases every one who has had a large experience in electrical treatment has seen and can testify to. Although there is much difference of opinion regarding the efficacy of electricity in the treatment of affections of this kind, this difference depends very largely on the difference in the views entertained regarding the pathology and the consequent diagnosis of such cases.

Probably no two persons would agree exactly as to what shall be included under and what shall be excluded from neurasthenia. With many neurasthenia is a general cloak to cover almost any functional disturbance; with others it is limited to a comparatively small class of cases. The tendency at present is to expand the term and make of it a sort of general omnibus, into which everything that is not organic, or does not belong to a special type, shall be dumped. It seems as if, like an omnibus, there is always room for one more disease. This tendency, it is needless to say, has already gone too far. It is time that a serious attempt should be made to differentiate the various types of functional diseases of this sort from one another, and to classify them according to their pathology. The writer's views regarding what class of cases are likely to be benefited and what are not will, perhaps, be best explained by a few illustrative cases:—

Cases Not Benefited. Observation 1.—Woman, about 50 years of age; in opulent circumstances. Descended from neurotic family, has always been neurotic from childhood; never has been strong; as a girl was subjected to a great deal of nervous strain, and, being of almost a morbidly conscientious temperament, has always found it difficult to reconcile her actions with her ideas of duty. Great tendency to dwell on the moral side of any contemplated act. Nutrition is poor; underfed; rather anæmic. Breaks down under almost any strain; suffers from sick-headache; tender spine; nausea; functional ataxia; vasomotor phenomena; heat and flushes; cold hands and feet; palpitation; general muscular weakness; hemiparæsthesia and anæsthesia (subjective only) of left side. Any psychical shock, such as a rude word or personal controversy, will bring on a whole series of these symptoms. Cannot walk without becoming greatly exhausted and other symptoms following. Auto-suggestion marked and easily recognized. This can be taken advantage of for treatment. Patient is intellectual, unusually intelligent, and cultured. As soon as her condition is improved she breaks down under some strain which would not affect another person. Attempt was made to treat her by electricity, but, although a very slight charge of the static electricity was used, a series of symptoms developed which, it was later ascertained, were identical with those supposed to be caused in her by a thunder-storm. Patient confessed she had prejudices against electricity and expected just such symptoms would come on.

Observation 2.—Woman, about 30 years of age; in well-to-do circumstances. Neurotic from her childhood. Had quite frequently fallen into hysterical trances. Symptoms: General lack of strength, palpitation, headache, dyspepsia, vasomotor disturbances, poor nutrition. Physical exertion causes great prostration, vasomotor and other disturbances. Treated by the rest-cure with great gain in weight; nutrition improved, and she was much better generally. Broke down again immediately after attempting to return to ordinary

life. Electricity not only failed to relieve the symptoms, but, as in Observation 1, produced symptoms said to be similar to those produced by a thunder-storm. The reflex irritability was extreme: almost any form of irritation, whether physical or mental, produced distressing symptoms.

Observation 3.—Young woman, married, 22 or 23 years of age, with neurotic antecedents. Health poor generally; dyspepsia; unable to eat more than the slightest quantity of food; irritability and torpid action of the bowels alternating with each other; great physical fatigue; very marked symptoms of pseudo-angina pectoris, which always caused much alarm. The fright from these attacks induced, in turn, numerous association symptoms. The cardiac attacks were brought on by physical exhaustion, mental irritation, and indigestion. In consequence of last, patient even refused to put water into her stomach. Under the Weir-Mitchell treatment patient was taught to take and digest large quantities of food, and her physical condition improved generally; but she did not regain strength, and immediately broke down again on her restoration to her former habits of life. Electrical treatment in this case failed to accomplish any beneficial results.

Cases Curable by Electricity. Observation 1.—Mrs. E., about 35 years old; naturally a strong, healthy woman. Well up to one year ago. Has led a fast life. Previous to breaking down, one year ago, had been drinking hard for two years. Finding herself becoming used up, broke off drinking entirely. About that time began to suffer from the same set of symptoms she has now; has been better off and on. Patient, when first seen, was in bed, where she had been for about ten days. Complained of palpitation, which she described as due to some supposed trouble of the heart, for which she had been treated. Also had "nervous feelings," the latter said to resemble the feeling from a faradic battery "that went all over her." These symptoms were very disagreeable, and alarmed her. Complained also of muscular weakness, "goneness," marked sleeplessness, general numbness, and dizziness; unable to walk but a very short distance, because of prostration. Physical tire brought on attacks of the above symptoms. Patient was up late at night and obtained very little rest and sleep. Had been treated during the past year by various doctors. One had treated her for a long while for heart disease. Physical examination showed her to be a strong, healthy-looking woman, good color, heart normal, no objective signs. Told to get up next day and come to the office in a carriage for electricity. Patient considered her condition so serious that she was arranging to break up her household and go into the country. Next day, treated by static electricity. The effect of the first sitting was beneficial. She at once felt better, refreshed, and relieved of various symptoms. Two days later patient reported herself as greatly improved: symptoms had largely disappeared, and she slept well. Static electricity was re-applied with same beneficial effect. After this, patient so well that treatment was discontinued, and she gave up her plan of going into the country.

Observation 2.—Mrs. E., 35 years old; married; has the appearance of being a strong, healthy person, with good color, but states that she never had been strong and was always easily tired. Eleven years ago, while going down front steps, slipped and fell, striking her back; fainted. Ever since has had a pain in the middle of her spine. This pain has increased of late, until now it is difficult for her to do any work. Is wearing a spinal corset for this, and is supposed to have some sort of lateral curvature. Has had numbness of the whole left side, off and on, for eleven years. These symptoms antedate the fall. Feels tired all the time; lack of energy; little things worry her; has sleepy spells during the day-time, when she lies down and sleeps soundly; almost impossible to keep awake at such times; walking, housework, and driving tire her and make her back ache. This pain is "terrible"; feels dizzy at times, as if falling backward; certain positions in bed make her feel as if turning a somersault backward; nausea at times; has "gone," faint feelings. Patient says that sometimes, on waking from these sleepy spells, she knows what is going on around her, but cannot speak. Mother and maternal grandfather are said to have had "fits" (?) (no spasms). Number of others died of consumption. Physical examination: No objective symptoms, except great tenderness of the spine. Treatment: Patient ordered to take off the spinal corset, and static electricity given, at first every other day, then at longer intervals. Eight sittings were given in all. The effect of electricity at each sitting was to dispel

any unpleasant symptoms present, such as tenderness of the spine, headache, and numbness, and patient declared herself as feeling better and stronger after each application. At first symptoms returned after a number of hours, but in less intense degree. After eight sittings patient reported herself as well; able to walk long distances, and feeling in good health.

There was evidently a strong hysterical element in this case; patient was plainly amenable to suggestion, auto- and extrinsic. The brilliant effect of the treatment in this case is enhanced when it is remembered that for several years the patient had been an invalid, practically unfit for any duties in life; could do little without great suffering, and had been under constant treatment. It should be said, though, that the effect of electrical treatment was supplemented by strong moral lectures and a hygienic regulation of her life.

Observation 8.—Mild neurasthenia following the "grip." Lady, 51 years of age; in affluent circumstances; of a neurotic temperament. Symptoms: General malaise; slight prostration and subjective numbness of left side, or hemiparæsthesia. Treatment: Galvanization of the spine: after each sitting patient felt much refreshed and symptoms were dissipated. Patient expressed herself as being greatly relieved by electricity; after a few sittings patient discharged, cured. This patient previously had suffered at different times from a similar group of symptoms, and has always been benefited by electricity. Besides dispelling the symptoms, electricity acted as a general tonic.

It may be objected that cases in which striking curative results of this kind are obtained by electrical treatment are not really true cases of neurasthenia; that they are some form of neurosis simulating, but not identical with, neurasthenia. The writer has himself often pondered over this question, and has often asked himself whether such cases should not rather be called pseudo-, or false, neurasthenia, and has frequently been tempted to make a separate classification of neuroses under this head. But the attempt to do so has been thwarted by the difficulty of precisely defining what should be called true neurasthenia. The symptom-pictures of many are so similar that they cannot be distinguished except by the results of treatment, and, therefore, the differential diagnosis would have to rest upon the therapeutic results. This, in itself, for obvious reasons, is a very dangerous ground upon which to base pathological distinctions. Many cases which have promptly responded to a special treatment other than electrization have persisted for years in a neurotic condition under continuous and varied treatment improperly applied. A counter-objection might also be raised to limiting the term "neurasthenia" to the severe forms, on the ground that many of them, such as those that have been described above as well-nigh incurable, are themselves not true neurasthenia, but are dependent upon some profound pathological processes in the nervous system, of the exact nature of which we are yet ignorant. Some of them are certainly due to developmental effects and to hereditary influences. The careful study of many cases seems to indicate that in certain individuals the normal evolutionary process in the nervous system ceases at an early age, and the process

of dissolution sets in. This dissolution process thus gives rise to positive and negative symptoms generally classed as neurasthenic. The pathology of such cases must be regarded as very distinct from those which, in the midst of robust, active health, temporarily break down, as the result of overwork and mental and physical strain. Furthermore, the separation of a distinct class of neuroses as pseudo-neurasthenia does not give us any deeper insight into the pathological processes, and we should remain just as ignorant as before of their true nature. As long as the pathology of both true and false neurasthenia is unknown, it is impossible to say how much there may or may not be that is common to the pathological processes underlying each. For the present, it would seem better to regard pseudo-, or mimetic, neurasthenia as a true neurasthenia of limited intensity and extent, but on which have become engrafted various associated processes, of which it is principally made up. These associated processes are not in themselves the expression of disease of their own centres, but rather of the physiological activity of nervous segments which have ceased to be controlled by the normal inhibitory inferences of higher centres. It is for this reason that the electrical treatment in such cases seems to present such magical results.

Special Modes of Treatment.—Speaking now more specifically of special modes of treatment by electricity, it may be laid down as a general rule that our aim must be, in all cases, to fight the individual symptoms. Headache, insomnia, spinal pain and tenderness, muscular weakness, each must be attacked by itself. Headache and insomnia are often overcome by the galvanization of the head, or by the static douche. Sometimes the one form of electricity is the more efficacious, and sometimes the other. Tenderness of the spine is, as a rule, relieved or dispelled by one or another of the different forms of electricity. It is not uncommon to see the symptoms disappear immediately, under the influence of electrization, and remain absent for hours. In this way the patient may obtain prolonged relief from constant suffering. The same may be said of lumbar, abdominal, and other pains. These symptoms, however, do tend to return, after intervals of greater or less extent,—as a rule, after some hours,—but on their return they will generally be found to be less severe, and, if the patient is improving, they will be observed, after each sitting, to be of less and less intensity, until finally they disappear altogether.

Mental symptoms, such as melancholia or depression, vertigo, inability to apply the mind, etc., are also frequently benefited. The hemiparæsthesia, as a rule, of the left side, so commonly met with in neurasthenics, is readily dissipated by electricity. As a general tonic, electricity at times acts in a very striking manner, and patients declare themselves feeling refreshed and invigorated. They walk better and seem to have more vigor.

Regarding the *choice* of electricity, it is impossible to lay down rules that shall govern us in all cases. Sometimes all three forms—galvanism, faradism, and franklinism—act equally well. Sometimes one form produces distinctly superior results. For cerebral symptoms, galvanization of the head is strongly recommended by some writers, the current being passed longitudinally, transversely, or diagonally. Löwenfeld advises that, when symptoms of congestion are present, the anode should be placed on the forehead and the cathode on the back of the neck. He bases these rules on experimental results that he obtained on rabbits.¹ Even, however, if the same electrical effects are produced in diseased conditions in man (and it is very doubtful if this is the case), our knowledge of congestion and anæmia of the brain is too chimerical to allow us to base treatment upon rules of this kind with any degree of confidence. It seems to the writer that the results of electrical treatment do not bear out the statements made by various German authors, who lay down minute rules regarding the direction of the current and the poles to be used to overcome this or that pathological condition supposed to be present. I have not been able to satisfy myself that the effects obtained depend on the direction of the current or the character of the exciting pole. It is true that different physiological subjective symptoms are produced, according as the current is passed transversely through the temples, or longitudinally from the forehead to the nape of the neck. But these symptoms are mostly only subjective, and there is not sufficient evidence that the influence upon pathological processes similarly varies. Our knowledge of the therapeutic effect of electricity, as of drugs, is entirely empirical, and we must be governed in our use of it by the clinical results obtained. Certain it is, however, that the application of the poles of a galvanic battery to the head is often followed by a relief of many mental symptoms. Patients say, after each application, that their heads feel clearer, that the depression has vanished, and the feeling of weight and pressure on the top of the head gone; and they look forward with pleasure to each application.

The strength of the galvanic current should be such that it can be borne without great discomfort. Many writers caution very strongly against the use of any but very mild currents to the brain. It seems to the writer that rather overcaution has been exhibited in this respect. It is true that patients have sometimes, under very strong currents, experienced very disagreeable symptoms, and have even fainted; but such symptoms are not in themselves dangerous, and, if the current is maintained within the limits of strength that will produce such symptoms, no danger need be apprehended. Some writers say that not more than 1 or 2 milliamperes should be used; but a better rule is to be guided by the physiological effect experienced. It would seem best to increase the current gradually until the first signs of vertigo are experienced, and

¹ Vide p. K-34.

then decrease the current at once if the vertigo increase or persist in a disagreeable form. It is, however, true that few patients can take more than 4 or 5 milliamperes without extremely disagreeable sensations, but, if more can be borne, it is well to take advantage of the fact.

Five or ten minutes are usually sufficient for a sitting. The application should be made daily, if the circumstances are such that it is possible; or, at least, this is desirable for the first week or two; later, three or four times a week would be ample. Excepting when very weak currents are employed to the head, it should be a cardinal rule never to break the current, or make it, while the electrodes are *in situ*. Shocks of this kind are liable to produce very disagreeable symptoms. The best method is gradually to increase the current after the electrodes have been placed upon the head at the spot desired, and then to move them about without removing them from contact with the skin. In galvanizing the spine it is best to place one electrode at the lumbar extremity and the other on the neck, and then, while holding one steady, to pass the other up and down the whole length of the spine, allowing it to dwell for a longer or shorter time upon tender points, according as the patient is able to bear it. A good plan is to keep one electrode on one of these points, and to persist in the spinal galvanization of the spine until the patient expresses feeling relieved of his symptoms. In fact, it is always well, in applying electricity, whether to the head or to the body, to persist until some degree of improvement, even if slight, is felt by the patient. Sometimes, when a distinctly stimulating effect is desired, it is beneficial to make and break the current while the electrodes are over the spine. The strength of the current should be as strong as can be borne without discomfort. It is not desirable to make the current painful or disagreeable. When spots are present particularly sensitive to the current, the electrodes need not be allowed to remain on them longer than can well be borne, but the current should be repeatedly applied to them until relief is felt.

Arndt recommends general galvanization in neurasthenia. He advises that, when it is desired to obtain a quieting effect, as in the first stage of neurasthenia, the positive pole should be applied centrally and the cathode peripherally. When the opposite, or stimulating, effect is desired, as in the second stage of the disease, the poles should be reversed,—i.e., the negative should be placed centrally and the anode peripherally. Unfortunately, little confidence can be placed in a system based on supposed differences in the therapeutic action of the two poles or of direction of the current, and equally good results are obtained by those who disregard rules of this kind. Sufficient has already been said on this point. Eulenberg, Erb, and others also recommend galvanism, either general or local, in this disease.

General galvanism, which was brought into prominence by Beard and Rockwell, is done as follows: One electrode is placed upon the feet.

It should be large, so that it can be retained *in situ*, during the sitting, without discomfort. The other electrode is then passed successively over the different parts of the whole body,—the limbs, the back and the spine, the abdomen, the neck, and, lastly, the head. When a painful spot, or a part the seat of pain, is reached, the electrode should be allowed to rest upon it or repeatedly passed over it until some degree of relief is obtained. It is sometimes surprising to see how local symptoms may be dissipated in this way. Tender spine, for example, may be readily quieted for the time being, at least. When treating the limbs, it is desirable to make the muscles contract a few times through the motor points. The object sought is twofold,—the stimulation of the whole nervous system through the muscles, skin, and peripheral nerves, and the inhibition of morbid central nervous processes. Twenty minutes will be found sufficient for a sitting. Care must be taken not to use too strong a current, otherwise stimulation will become irritation, and general secondary nervous symptoms may develop, to the chagrin of the physician and the disappointment of the patient.

Electrization, in this disease particularly, may easily be overdone, and the physician will be unpleasantly surprised to find that, instead of benefiting his patient, he has made a bad matter worse. This is not true of all cases of neurasthenia, but only of a certain class. It is not possible to determine beforehand what cases belong to this class.

So-called central galvanization is another mode of applying the galvanic current. I cannot help regarding it as a refinement, without practical advantage over other methods. It consists in placing one electrode over the epigastrium (the negative, as recommended by Beard), and applying the other to the spine, head, and “sympathetic.” The object is to concentrate in this way the action of the current on the central nervous system. It does not appear that the results accomplished by this mode of electrization are superior to those obtained by the other methods above described, or that the central nervous system is more directly acted upon. The brain is fully as well acted upon when both electrodes are placed upon the head, and the evidence is lacking that the spinal cord can be directly influenced by the current. Although clinical experience shows that electrization over the spine does have a therapeutic effect, this is probably due to reflex action. The same may be said of galvanism of the sympathetic, which de Watteville has shown to be a piece of imaginary therapeutics, as there is no reason to believe that the sympathetic is acted upon. He proposes the name “subaural galvanization,” as the application of electricity to this region is believed to have a special effect in neuroses.

Faradism is also recommended by some writers. Arndt advises that the faradic current be used when an indirect stimulation of the nervous system is desired,—that is, through the skin. This author cautions against the use of too strong a current, or too frequent or too

extended applications of the same. In this he is quite right, though there are some cases which can be faradized without limit. General faradism, so highly spoken of by Beard, is also strongly recommended. The technique is the same as when using general galvanization.

Another method of using faradism is that advocated by Rumpf,—namely, the brushing of large surfaces with the faradic brush. This method is based on the experiments (already referred to) by Rumpf, Nothnagel, and others, who found that excitation of the skin was followed by contraction of the vessels of the brain and spinal cord. Rumpf claims to have obtained very favorable therapeutic results by this method.

Of late years *static electricity* has come more and more into use. The ease with which it can be applied—avoiding, as it does, the necessity of the removal of the clothing and the wetting of the body—makes it a particularly convenient form of electrization; and for this reason, when its effects are equally good, it will always be given the preference by the physician. In some forms of neurasthenia the effect of static electricity is particularly good,—fully equal and often superior to that of galvanism or faradism. In relieving insomnia, headache,—above all, mental depression and spinal tenderness,—the writer has obtained very favorable results with it. The different effects that can be produced, according as the spark, the douche or breeze, or simple insulation is employed, render it a very valuable therapeutic agent. It can be even converted into the dynamic variety, with effects similar to that of the faradic current. The static breeze, applied to the head, will sometimes relieve depression and headache like magic. Severe peripheral pains and the different neuralgias are very readily relieved by the spark. Even the pains of neuritis are often temporarily modified. One has to be careful, however, with sensitive patients, not to begin too violently with this form of electricity. Very sensitive patients often at first respond badly to static electricity when given strong, and for this reason it is often best with them to begin with the milder galvanic current, and later change to static electricity.

Electric baths remain to be spoken of. These have been strongly advocated by some writers. Electrization is certainly more general by this method than by any other, but whether it is more effective remains to be proved. Theoretically, there does not seem to be any reason why it should be, or even as effective. I have not myself had any experience with electric baths, and, therefore, cannot express an opinion on this point. It is probable that they appeal to the imagination, and, therefore, have a psychical influence. One advantage that this method has is, that it combines the effects of baths and electricity. Hot and cold baths, particularly the former, are often very soothing and refreshing in neurasthenia. I have known them to be very useful in this respect, and, when combined with electricity, I can imagine the effect to be very

pleasant. Those who have used them declare them to have an invigorating effect; but the local action cannot be as powerful as when the electrodes are applied directly to the body.

ASSOCIATION NEUROSIS.

There is a neurosis to which I have elsewhere¹ called attention, and to which I ventured to give the name *association neurosis*. It includes a number of local affections, which are generally classified as hysterical, neurasthenic, traumatic, etc. It consists of a group of symptoms which, as a rule, have originated in some previous acute affection, such as inflammation, traumatism causing local injury or nervous shock, fever, or true neurasthenia, and which have become welded together by the process of association so that they persist as a distinct neurosis after the subsidence of the original disease. Many cases of hysterical joints are of this nature, as are also many of the so-called "railway spines" (spinal concussion) and neurasthenia (pseudo-neurasthenia).

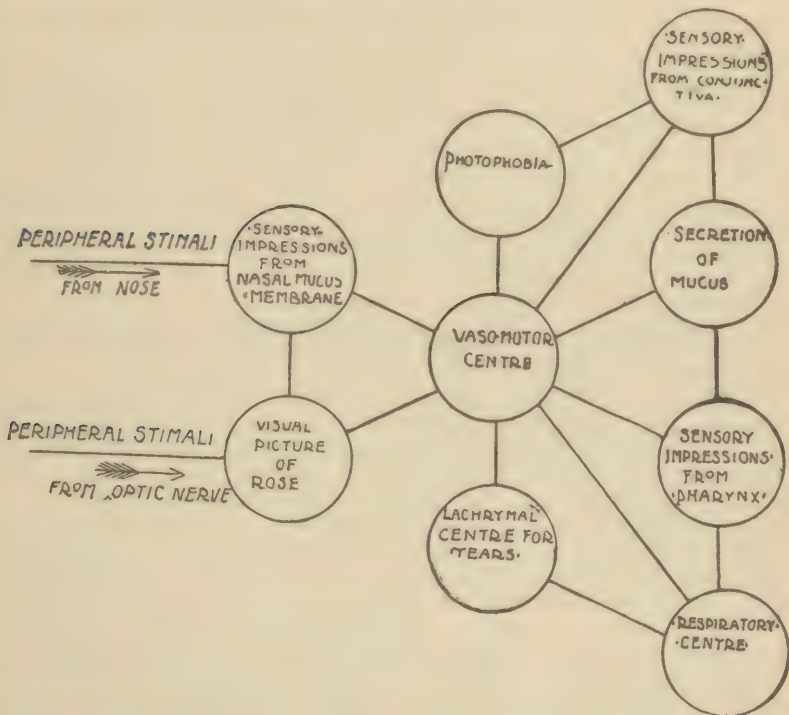
The constant and synchronous excitation of any group of symptoms tends to associate them together, so that in course of time the excitation of any one of them awakens the others, and they become perpetuated as a neurosis. The psychical element is a very large factor in keeping them alive. As long as the mind dwells upon them, consciously or subconsciously, it is very difficult for such a group of symptoms to subside, though the original physiological condition, such as an inflamed joint, muscular strain, or nervous shock, has ceased to exist. Auto-suggestion is, then, the active agent for maintaining the affection. For this reason, when such a neurosis has originated in the shock from a railway accident, recovery is apt to take place rapidly after the cessation of litigation, and in such cases an unjust suspicion is apt to be entertained of the assumed character of the disability. This pathology explains their persistence without accompanying physical signs of disease, and the recovery from them after a cessation of the mental agitation. They persist, however, in other cases, without evident mental cause, and when apparently the patient's mind is free from all anxiety regarding the condition. The neurosis is then maintained by the force of the association of morbid processes. Such a neurosis is sometimes termed "*neuromimesis*," and is not infrequently mistaken for more serious disease.

A case of coryza reported by Mackensie, of Baltimore, so aptly illustrates this neurosis that I am tempted to again cite it here, and, for convenience, quote from the communication above referred to. It shows the association of a *single mental state with a pure physical process* :—

It was that of a lady who had been for years a terrible sufferer from rose cold, or hay fever. The disease became aggravated by the addition of asthmatic attacks, which complicated the coryza. She had become so sensitive that the number of exciting causes of

¹ Journal of Nervous and Mental Diseases, May, 1891.

an attack was very large. She was so sensitive to roses that the mere presence of a rose in the same room was sufficient to induce an attack. Suspecting the nature of her trouble, Mackensie obtained an artificial rose of such exquisite workmanship that it presented a perfect counterfeit of the original. One day, when the lady came to his office, after assuring himself by careful examination that she was perfectly free from coryza, Mackensie produced the artificial rose from behind a screen, where it had been concealed, and held it in front of her. Almost immediately a violent attack of coryza developed. Her eyes became suffused with tears, the conjunctiva injected; the puncta lachryma began to itch violently; her face became flushed, the nasal passages obstructed, her voice hoarse and nasal; she complained of a desire to sneeze and tickling and intense itching in the back of the throat and in the auditory meatus; there was also photophobia and secretion of fluid from the nasal passages; to this was added a feeling of oppression in the chest and a slight embarrassment



of respiration. Examination showed the nostrils almost completely obstructed by swollen, reddened, and irritable turbinated structures, and filled with fluid. The mucous membrane of the throat was injected. At this point Dr. Mackensie stopped the experiment, thinking it had gone far enough, and the patient left the office with a severe attack of coryza.

The sequel is equally interesting. The true nature of the rose was shown to the patient, with the result that on her next visit she plunged her face into a bunch of real roses without ill effect.¹

In this case we have all the phenomena of inflammation, a series of apparently organic processes set into activity by the force of an associated idea. It would seem as if the physiological processes of secretion of tears, secretion of mucus, vasomotor action (causing injection of tissue), pain, etc., were united into an automatic mechanism, and the whole

¹ Am. Journ. Med. Sciences, vol. xci, p. 45, 1886. The reader is referred to this interesting paper for accounts of numerous cases of neuroses, of various kinds, associated with a fixed idea.

connected (associated), as with a spring, with a higher visual centre, which, when touched, set off the whole mechanism. The principle here involved is an important one, and it will be well to bear it in mind when we come to consider other complex associations. It shows conclusively the possibility of an automatic nervous process of considerable complexity becoming established, and afterward excited anew as an independent neurosis by a purely physiological stimulus.

The whole process is illustrated by the diagram on preceding page.

Originally the peripheral stimuli which created the neurosis came from the nasal mucous membrane. Afterward, when the different centres had become welded together into an automatic whole, the entire process was exploded by the visual impressions from the optic nerve stimulating one of the associated centres.

It is not always that this neurosis is met with in a pure form. More frequently it is observed in a group of symptoms which have developed in the course of neurasthenia, or some other affection, of which it forms the most prominent feature: or the main disease having subsided somewhat, this group is left in still greater prominence. The association neurosis, in either case, stands out in relief as the chief disability, but a careful examination will show the existence of the original disease. Sometimes the neurosis remains hidden amongst a mass of neurasthenic or hysterical symptoms, from which it can be separated only by keen analysis of the existing symptoms and by investigation into their origin and occurrence.

The following cases will illustrate the character and treatment of this class of nervous affections:—

Observation 1.—G. B., young man about 25 years old. Referred to me by a specialist in genito-urinary disease for localized pain in the right inguinal region and frequent micturition. The patient was unable to retain his urine but for a short time, because of the pain which was produced by distension of the bladder. The pain, after continuing for a time, diffused itself somewhat over the lower abdomen. Obligated to get up frequently at night. As patient expressed it, probably somewhat hyperbolically, he “spent all his time in the water-closet.” Secondary symptoms developed after the pain persisted for some time, such as faintness, pains in other parts of the body, etc. Muscular exertion seemed to bring on the pain, or he thought it did; so he had given up all exercise and was disinclined to work at his business as a salesman. Cross-examination brought out the fact that he attributed his trouble to his having strained himself during connection with a woman, for on the following day he noticed the pain, and at the same time had uncomfortable feeling in the urethra. These increased and frequent micturition followed. Was afraid at the time he had gonorrhœa, or had injured himself. These symptoms had persisted for a year, during which time he had been treated by several physicians, all of whom had told him “there was nothing the matter,” but the neurosis had increased rather than decreased. In accordance with this opinion of physicians, his parents had shown little sympathy, and obliged him to work. In consequence of this home-treatment he had become morose, depressed, and ill-natured; considered himself badly treated. This had reacted on parents, etc. Confessed that the idea of having seriously injured himself had preyed upon his mind.

Treatment: Nature of malady carefully explained to patient, and strong static sparks applied to the seat of the pain. The strongest were borne without flinching, the patient appearing to enjoy the pain of the electricity.¹ He left the office free from pain for the first time for a year, and, of course, in high spirits. The pain returned after a number of hours, but with diminished intensity. Electricity was given in all seven times. After each sitting the intervals of relief became longer and pain returned in milder degree; ability to retain urine increased at same time. After seven applications, discharged well. In this case the

¹ This is not uncommon, when the original suffering has been persistent and severe.

symptoms (pain, hyperæsthesia of bladder, etc.) had probably originated in some muscular strain and urethral irritations. After the cessation of the morbid physiological process, the symptoms had by association become bound together with other bodily sensations and movements, such as distension of bladder and movement of the abdominal muscles, and had persisted as a habit neurosis. The physiological excitation had prevented them from subsiding. The electricity not only allayed his mental fears, but broke up the association by suppressing the pain. There were no hysterical symptoms.

Numerous personal observations might be cited to illustrate this neurosis. A few only will be mentioned here, as it is not desirable to introduce the accounts of more cases than are necessary to make clear the view maintained here of the pathology of the affection.

The following, already published, is a case in point:—

Observation 2.—A woman, 41 years of age, came to me complaining of paroxysms of pain, from which she had suffered for ten years past. The pain was located in the epigastrium, and sometimes was accompanied by pain under the right eye and in the soles of the feet. It was described as hot and burning in character, “just as if you put your finger on the stove” (as she said). These paroxysms came on nearly every day, and lasted from one minute to half an hour; when occurring at night, she was unable to obtain any sleep. As a rule, during the day she “could not go over two hours without pain” of greater or less severity. Physical examination showed nothing abnormal beyond a tender spot at the junction of the sixth or seventh rib with the sternum, on the left side. She was of a nervous, anxious temperament, easily worried, and disturbed by trifles. Cross examination revealed the fact that ten years ago she received a great nervous shock in the form of some “terrible news.” She thinks the first pain came simultaneously with the nervous shock, and she ascribes her condition to that accident. At that time she became “numb all over”; “for four or five months could not sleep at all”; felt dazed and confused in mind; if spoken to, voices sounded “away, away off.” This is the best description I can obtain of her condition at that time. At present any mental worry or excitement causes a paroxysm; for example, after waiting two hours in my office without seeing me, she went away, under the disappointment, “all doubled up with pain.” Physically she is in good condition: is strong and can walk long distances; her spirits are easily depressed or elevated; overtire, worry, or disappointment—in fact, anything that upsets her mental equilibrium—brings on a paroxysm.

The treatment in this case was static electricity. After a few sittings the paroxysms of pain ceased; and she was in every way better mentally and physically. She said she “felt like a different woman.” She was free from any attack while under observation, for a period of four or five weeks, when she was discharged.

The order of events in this case I conceive to be as follows: Ten years ago this patient was attacked with an acute nervous illness, of which two prominent symptoms were mental distress and epigastric pain. These two processes were so frequently associated together that a reflex physiological connection became established between their nervous centres; the presence of the one then necessitated the reproduction of the other; and when, later, recovery from the acute illness occurred, the association being persistent, the presence of any physiological excitement or anxiety was necessarily accompanied by a paroxysm of pain. The pathological condition lay in the association of two centres, and not in the centres themselves. The treatment resulted in the breaking up of this association, probably by means of suggestion.

One curious mode by which this neurosis may arise is pure mimicry,—that is, where simple observation of the person affected with a disease is sufficient to induce similar symptoms in an impressionable subject. This is a form of auto-suggestion. Secondary symptoms may be added to the suggested or mimetic ones, oftentimes as the result of emotional disturbance, and the whole may become grouped together by association

into a true neurosis, which may persist by itself indefinitely. The following is a case in point:—

Observation 3.—A certain person was affected with cerebral syphilis, from which disease he eventually died. His eyes were also attacked by the disease, and he presented an unpleasant sight. A friend of this person, who saw him frequently, was much impressed by what appeared to him a horrible disease. Syphilophobia developed, and he began to imagine that he had the disease himself. Soon his eyes began to pain severely, and he ran from one physician to another, without relief, until one told him that the pain in his eyes was purely mental, and then this symptom subsided. Meanwhile, a train of symptoms had developed, which he described in this way: First, the idea of the man with the real disease kept coming into his mind. Then he thought that he himself might have it. Then he became frightened; his body was bathed in sweat, and he felt nauseated. Then severe pain in the top of his head was added; he felt weak, depressed in spirits, and had insomnia. He had twichings in the muscles of his arms and legs. His nights were disturbed by horrible dreams. At first these symptoms only developed when the idea of the syphilitic patient was present to his mind. Later they became more persistent, lasted a longer time, until, finally, anything that depressed his mental equilibrium or overtired him brought them on. When he presented himself for examination, about six months after the beginning of the neurosis, he was attacked by this group of symptoms several times a day, the exciting influence being usually some unpleasant idea or overtire. He recognized perfectly the nature of his malady, but said it was absolutely impossible for him to control it. He was fully aware of the effect of his imagination in producing these symptoms. Pain in the head, mental depression, and insomnia were the most distressing of the symptoms, and beyond his control. On a previous occasion he had suffered from a very similar train of symptoms, due to the fact that he was bitten by a cat, and imagined he had hydrophobia. Nausea and vomiting had occurred at the beginning of both these attacks. This patient has been cured by electrical treatment and physical hygiene.

Electricity is a very powerful agent in curing this neurosis. It probably acts in two ways: first, by inhibiting by local stimulation one or more of the symptoms composing the group, and thus breaking up the association; and, second, by suggestion allaying the psychical factor and allowing the process to subside. I have found static electricity very valuable for this purpose, both in the form of breeze and sparks. It should be given locally for the individual symptoms, and generally for its refreshing, tonic effect. Faradism and galvanism also work well, but I have relied more on the static variety, without, however, having made comparative tests. The technique is the same as in other neuroses.

The aim of treatment should be to inhibit, if possible, the various individual symptoms, so as to break up the morbid association. For this purpose electricity should be applied so as to attack separately the various psychical and bodily symptoms. The same methods are applicable as in the treatment of the psychoses and neurasthenia, which have already been described. The next important problem should be to do away with such psychical influences as tend to keep up the neurosis. Auto-suggestion plays a very conspicuous part in this respect, and, so long as the patient's mind constantly dwells upon his ailment, it is difficult to accomplish much in the way of relief. Therefore it is well, with most patients, to begin by explaining carefully the nature of the malady and giving assurance of the absence of serious disease. When

neurasthenia or hysteria co-exists, as it frequently does, it should be independently treated.

Electricity does not always effect a cure in these cases. Sometimes, as in other affections, its results are very disappointing; and, although, in some cases, we may feel absolutely sure of the correctness of our diagnosis, it seems almost impossible to break up the pathological association. An instance in point is the case of neurasthenia already referred to on page K-54 ("Observation 3"), where, although I was firmly convinced that the great mass of symptoms were dependent upon a morbid association process in a neurasthenic subject, yet I found it impossible, by electricity or any other treatment, to effect a cure. The patient suffered from every kind of neurasthenic symptom. There were gastric, intestinal, cardiac, cephalic, and vasomotor disturbances, combined with malnutrition, all associated together; and the presence of one, as a little dyspepsia, brought with it the whole train of other disturbances, like the explosion of a train of gunpowder fired by a match. The patient was treated by the Weir-Mitchell rest-cure, but, although fattened and improved, immediately broke down again on resuming her social duties. The nature of the malady was carefully explained to her, but, although her co-operation and faith were given most generously, little permanent result was effected. Electricity was without benefit. The final history of this patient is instructive. After she left my hands she tried "Christian Science," and was cured in two weeks. Her faith literally "made her whole." Therefore, it may be said that, while some cases yield like magic to treatment, others are very rebellious, although every case is susceptible of cure.

TRAUMATIC NEUROSES.

As traumatic neuroses include a number of different affections, such as traumatic neurasthenia, traumatic hysteria, nervous shock, etc., the treatment of them is more properly included under the head of these same affections when due to other causes than traumatism. The treatment of traumatic neurasthenia, for example, differs very little from the treatment of the same neurosis when occurring under other conditions, and what has been said of the effect of the electrical treatment of these idiopathic affections is true of them when due to injury. There is much difference of opinion among neurologists regarding the prognosis in such cases. In the opinion of the writer, however, both traumatic hysteria and traumatic neurasthenia tend toward recovery,—much more so than do the same affections when occurring idiopathically. There are, however, marked exceptions to this general rule. As has been before so often insisted upon, the presence of litigation and other conditions tending to keep alive the symptoms is always an obstacle in the way of electrical as well as of all other treatment, and little can be expected in the way of cure so long as such conditions exist. For the electrical treatment

of these various neuroses the reader is referred to what has already been said.

There is a form of traumatic neurosis, however, which, perhaps, requires separate discussion. Although most cases of injury to the nervous system may be classified under one of several well-recognized types of disease, organic or functional, we sometimes meet with other cases which present groups of symptoms, of irregular distribution and complex in their arrangement, which cannot very well be classed under any recognized affection of the nervous system. They seem to be *sui generis*, and a distinct pathology has been claimed for them by the German school of neurologists. To them the term "traumatic neurosis" has been more distinctively given. It has been claimed that they are due to anatomical changes in the central nervous system, such as capillary hæmorrhages and inflammatory softenings, which have been induced by the physical shock or concussion. The fact that some of these cases do not recover—and a few have ended fatally—has been adduced in support of some such serious pathological condition. The old dogma of cerebro-spinal concussion has thus taken on a new form. In the opinion of the writer, however, the symptoms in most, if not all, of these cases are to be looked upon as an expression of profound physiological, and not of anatomical, shock. It is the overstimulation of the central nervous system by psychical and sensory impressions that has induced the complex group of symptoms, and not the physical injury *per se*. It seems to the writer that, notwithstanding the vigorous opposition of a certain school, particularly in Germany, the tendency of modern neurologists is toward this physiological view, rather than toward that of anatomical degeneration due to physical concussion.

Psychical and sensory impressions, when sufficiently intense, tend to be propagated beyond their normal limits, and to "slop over," so to speak, along adjoining nerve-tracts until they reach remotely-connected centres, and thus to induce symptoms which would not be awakened by normal and moderate stimulation of the same kind, in much the same way as when a river, owing to a freshet, overflows its banks and inundates the adjoining country, or when an electric storm induces in telephone- and telegraph- wires currents which ordinarily are inappreciable, and plays havoc with the recording instruments. Symptoms which have once been excited in this way do not easily subside, but persist as a neurosis. In a minor degree this has been observed by every one in the tremor of the limbs, in præcordial anxiety, headache, and what not, brought on by slight mental shock, emotion, or fear. Imagine all these to be intensified a hundred times, and see how easily a symptom-picture may be produced similar to that exhibited by these traumatic neuroses. Such a symptom-picture would be neither one of hysteria nor of neurasthenia. More properly it may be designated as a traumatic neurosis, as it is only by traumatism that such a state of things can be excited.

Whether, more than this, deeper anatomical degenerations occur in exceptional cases as the result of nervous shock or concussion, and which are the direct cause of the clinical phenomena, or whether, when found, they are not simply the concomitants of the nervous shock, are questions on which we are not at present in a position to dogmatize, although there is little proof either way. It is possible that, when these finer anatomical degenerations are found, they are only the secondary result of long-standing functional disease.

Limiting, then, for the purpose of this article, the term "traumatic neurosis" to cases of this kind, it may be said that electrical treatment is often capable of producing a very beneficial influence upon them. Provided that due care is taken to remove all unfavorable surrounding conditions, and to subject the patient to favorable hygienic conditions, electrization can be often used with great advantage. Symptoms which are distressing can frequently be overcome, and the patient rendered comfortable. Cases of minor severity are often rapidly cured. It is almost always desirable to give electricity a trial, as an adjuvant, at least, to other methods. The indications for its use and the technique are the same as for the treatment of neurasthenia and allied affections. Psychological symptoms can often be allayed by either galvanism to the head or by the static breeze. Insomnia and cephalalgia may sometimes be decidedly benefited. They should be treated as has already been described elsewhere.

Pain in the form of false neuralgias, which are so common in affections of this kind, can almost always be relieved by electricity. These neuralgias, though frequently of a psychological nature, are often very intense, so much so as sometimes, when long continued, to produce by themselves an hysterical condition. It is here that electricity becomes a most useful agent, and serves to keep the patient comfortable without the use of drugs and other undesirable remedies. Often local pains due to real injuries to parts, such as neuritis, are relieved, and the patient kept fairly comfortable, while time—if it be only that—effects a cure. General faradization or galvanization sometimes works well in toning up the general condition, but it is the local symptoms which we can particularly hope to affect.

Paralyses and anæsthesiæ behave as when occurring in the course of hysterical and allied neuroses. Some cases are uninfluenced by any treatment, and we can do little more than make the patient more comfortable, and trust to time, change of scene and surroundings, and other hygienic measures to eventually bring about a restoration to health. It is not always sufficiently understood that, while litigation is in progress, as is apt to be the case in almost all of these cases, no treatment of any kind will be of service. The most vigorous therapeutic measure is to hasten the settlement of the case, and put the patient in a position to undertake a rational treatment. It certainly is rarely of use to employ

electrization until this be done,—at least, with a hope of cure ; although, the symptoms may be allayed and the patient made more comfortable. The technique, then, of these neuroses is similar to that already described when speaking of neurasthenia and hysteria, and the reader is referred to what has been said there.

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